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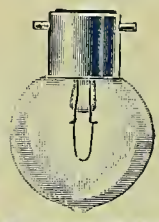

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INDEX.

A.

A.A.S. (article), 106
Abbatt, F. O. H. (letter), 528
A.B.C. Flat Twin Engine, 379
— Motor Cycles (illus.), 75
A.B.M. (letter), 574
Acceleration (comment), 25
Accessibility, 427
— Again, 489
— on the Road, 191
Accessories, Useful, 458
Accident, An Extraordinary, 429
Accumulators, Care of, 269
Acetone as a Fuel, 386
Ackerman Spring Wheel, 371
A.C.U. Annual General Meeting, 303
— — Report, 167, 209
— General Meeting, 212
Acetylene Lamps, 249
— Starting on, 54, 75, 105, 127, 145, 170, 172, 196, 242, 267
Acutt, L. R. L., 237
Addenbrooke, H. St. V., 38, 82, 338, 370, 456
Adjustable Motor Cycle Stand, 56
Adjustment of Mechanical Pumps, 280
Advantages of Co-operation, 541
— — Large Wheels, 372
Advice to Buyers of Second-hand Machines, 257
Aero Engine Design, Influence of, 461, 484
— Engines, Motor Cyclists and, 546
Aeroplane as Conveyance for Motor Cycle, 419
— Sidecar Bodies, 255
Aeroplanes for Sale, 521
Æsculapius (letter), 360
Africans in France, 352
After-the-war Problems, 536
Age for Driving Licences, 557
— — — — (leaderette), 389, 423
— 14 To-day, 280
Agopian, A. (letter), 430
Agricastrol, 174
A.H.S., Sherborne (letter), 60
A.J.B. (letters), 527, 550
A.J.S. (illus.), 183, 593
— Coal Gas Test, 53
— Commercial Outfit, 434
— for Military Work, 309
— Russian Model, 390
— Spring Saddle Pillar, 112
— 2¾ h.p. Outfit, 491
Albion Piston, 124
All-British Magneto Industry, 186
— Overseas Trade (Overseas letter), 314
All-weather Sidecar, A Combination Fitment for, 600
Alpha (article), 155
Aluminium and Air-cooling, 561
— Cylinder, The, 286
— Cylinders (leader), 557
— — Future of, 594
Altitude, A Question of, 220
Ambulance Work near the Line, 474
America Enters the Arena, 356
— Military Motor Cycling in, 403
American D.R.'s, 415
— Excelsior (letter), 37
— Factories in England, 3
— Import Duty on Motor Cycles, 427
— Invasion of Australia, 306
— Lady Motor Cyclists as D.R.'s, 519
— Lightweight Design, 560
— Limousine Sidecar (illus.), 32
— Machines, 303
— — and Colonial Riders, 183
— Motor Cyclists, Ten Thousand, 521
— National Guardsman, 496
— Sidecar Record, 10
— Solo Record, 52
— Tariffs on Motor Cycles, 449
America's Uses for Motor Cyclists, 211
A.M.I.E.E. (letter), 125
— London (letter), 60
Ailette (article), 227
Air-cooled Cycle Cars, 439
— Engines (letter), 198
— Pistons, 414
— Plug, An, 488
— Runabouts, 500
Air-cooling, 497
— the Crank Case, 530
Air Leaks, 459
— To Eliminate, 224
— Pressure in Tyres, 431, 457, 480, 527, 528, 549
— Screws, Lecture on, 209
— *v.* Water-cooling, 266, 285, 312, 337, 361, 406, 457
Andreae, Bertha A. (letter), 126
Anderson Quartz Plug, 458
Angleterre, Après la Somme, 468
Antoine V-twin Engine (illus.), 186
Anti-motoring Press, 521
Apollo Motor Cycle Horns, 174
Appeal from the Front, 169
Applications, 12,683, 475
Appreciation of the 3½ h.p. P. and M., 564, 601
Après la Guerre (letter), 480
Arheco Fuel, 515
Arbuthnot Trophy, 161, 163, 259, 280, 302, 310, 449, 518
A Reader in H.M. Navy, 265
A.R.T. (letter), 338
Ariel 5 h.p. Outfit (illus.), 492
— Motor Cycle, 520
— Saddle Suspension, 112
Armenia, Men of British Armoured Car Section Resting in, 423
Armoured Cars in Mesopotamia, 569
— — in the Euphrates, 238
Armstrong Tricycles, 174
Army Motor Cycles, 59
— — — Distinguishing Badges, 548
A.R.R. (letter), 310
A.S.S. (article), 73
A.S.C. Workshop Staff, 238
Association of British Motor and Allied Manufacturers, Badge of, 541
— — Private Owners, 35
Atkins, Gnr. W. W., 160
Atkinson, Gnr. F., 395
— Sgt., 548
Austin Motor Co., Garages for Soldiers, 40
Austin-Jones, L.-Cpl. D., 336
Australia, New Speed Records in, 252
— Noisy Motor Cycles in, 357
— Oil Pumps for, 600
— The Business Sidecar, 410
Australian Active Service Sidecar built in War Zone, 420
— Imports of Motor Cycles, 505
— Reader's Frame Design, An, 315
— Storm, An, 504
Australian's Conception of an Ideal Mount, 397
Automobile Association's Reduced Fee, 52
Auto Cycle Union Notes, 374
— Treble-purpose Road Sweeper, 56
Autoped, 35, 68, 398
Auto-Wheel, Starting an, 459
Auxiliary Motors, Those, 203
Average Prices, 35, 56, 79, 97, 115, 141, 186, 222, 236, 264, 275, 302, 332, 359, 373, 399, 427, 450, 471, 496, 511, 556, 570, 595
Avery Roff, E. (letter), 602
A Voice from Overseas, 589
Axford, Lt. Sydney R., R.F.C., 278

B.

B 525 (letter), 310
Baby Two-stroke, Over-driving a, 273
Badge of Association of British Motor and Allied Manufacturers, 541
— — the Motor Cycle Divisions of the U.S. Army, 280
Balancing, 341, 363
Bailey Flyer Motor Cycle, 2
— 2nd-A.M. L. L., 160
Ball Bearing Connecting Rod, 479, 500, 575, 609
— Capt., 210, 291
Ban on Petrol Substitutes, 240
Bankes-Jones, Rev. R. M., 519
Barker, S. (letter), 104
Barrow, G. S. (letter), 575
Bartels, C. B. G. (letter), 183
Barton, Temp. Lt. B. C., 210
Bath Chair, Elieson-Carter Electric, 478
Baxter, Late Lt. E. F., 568
Beacon (letter), 430
Beard, A. E. (letter), 455
Bearing Pressures, 11, 73, 103, 125, 146, 198
Beasley, 2nd-Lt. H. P. (illus.), 518
Bedell, Allan, 397
B.E.F. (letter), 362
Bees, Sgt. Leonard A., 119
Bell, Chief Motor Mechanic G., 307, 493
Belgian Motor Cyclist as Airman, 420
Belt Drive, 375
— Slip, 531
— Wear, 527, 549, 573, 601
Bentley, Arthur W., 419
Benzole—After the War, 332
— and its Production, 327
Beresford, I. C. (letter), 527
Berkshire Motor Volunteer Corps, 541
Bertollaci, E. R. A. (letter), 383
Best and Lloyd, Ltd. (letter), 339
Bethwaite, I. G., 241
Beware the Motor Cycle Thief, 598
Bewildering Assortment, A, 333
Big Singles and Australia, 589
Binks Anti-konking Device, 556
— C., Ltd., 355
Black Cat Tank Crew, 160
Blackpool Motor Volunteers, 53, 99, 187, 449
Bland, H. J. (letter), 168
Blic Magneto, 597
Blind Heroes, Our, 281
Blow Hole, Stopping a, 200
Bonniksen Speedometer, 171
Bonython, John, 242
Booth, H. V., 408
Bore-stroke Ratios, 253, 288, 312
Bosch British Interests Bought by Vickers, 332
— (letter), 169
— No More, 567
Boswell, R. S. (letter), 196
Boursfield, J. S., 434
Boursiac, Henry (letter), 312
Bowden Wire Nipple, 108
Bowie, Cpl. M. P., 308
Boyd, R. L. (letters), 125, 457
Boyce, W. E., 174
Boyton, Flight-Lt. Geoffrey, 568
B.P. Motor Spirit, 18
Bradbury All-chain Drive, 230
Bradford Battalion National Motor Volunteers, 448
Bradley, Lt.-Col. R. W., 95
Bradshaw, Granville E. (letters), 18, 82, 125, 128
— P. O. (letter), 289
Braid, Cpl. Raymond J., 564
Brake Lever, Fitting a Ratchet to a, 445
Breakage, An Unfortunate, 580
Brechin, M., 342
Bridgman, Mr. Ernest Ashford (illus.), 209
Brierly, Bob, 218
Briggs, F. (letter), 169
British and American Engineers, 426
— *v.* Foreign Magnetos (letter), 282
— Fuel after the War, 453
— — Test of, 515
— Imports and Exports for March, 399
— Machines Abroad, Price of, 315
— — in Portugal, 505
— Magnetos, 168, 288, 360
— — and Prompt Service, 373, 407
— — under Test, 250

British Motor Cycles, A Tribute to, 457
— — Cycle Trade, Magnitude of the, 588
— — Fuel (leaderette), 437
— — Industry after the War, 51
— — Trade, Protecting the, 166
— Roads the Best, 589
— Single v. American Twin, 397
Brittleness? Does Galvanising Cause, 455
Brooke Automatic Governor Pulley, 66
Brooks, Mr. Robert (letter), 397
Brophy Spring Frame, 108
Brough Flat Twin with Spring Frame, 423, 442
— 3½ h.p., 514
Broughton, A. (letter), 573
Brown, Co.-Sgt.-Major, 537
— D. Elyard (letters), 197, 198
Brownrigg, H. H. (letters), 37, 61, 529
B.S.A. (illus.), 451, 577
— Ascent of Mount Clarence by, 214
— in Japan (illus.), 27
— — S. Africa (illus.), 314
— Motor Cycles, A Consignment Ready for France, 375
B.T.C. (letter), 265
Bull, Driver G. H., 519
Bullock, W. E., Jnn., 256
Bunn, Rfn. F. A. (letter), 218
Burdekin, Bombr., 593
Burma, A Motor Cycle in, 184
Burney and Blackburne, Ltd. (letters), 103, 543
Burslem, A. H. (letter), 38
Burberry's Sale, 40
Burrell, Mrs., 537
Busby, Capt. Vernon, 160
'Bus Strike and Petrol, 449
Bush, T., 530
Business Names, 270
— Sidecar in Australia, 410
— The Motor Cycle in, 384
Butler, C. (letter), 315
— Edwin (letter), 406
Butt-ended Troubles, 200
Butterfield, A. (letter), 456

C.

Cadet (letter), 573
— Machine Gun Companies, 373
— R.F.C. (letter), 574
C.A.F. (letters), 405, 603
C.A.G.B. (letter), 505
C.A.L. (letter), 128
C.A.V. Magnetos, 174
California, The Motor Cycle in, 588
Calthorpe-Jap, Heavy Fuel Device fitted to, 408
Cam Design (article), 106
— — (letters), 126, 197
Campbell, Driver, G. S., 373
— R. C. (letter), 337
Campion, G., 525
Canadian Soldier Saluting American Flag (illus.), 356
Cann, Lt. H. J. (letter), 431
Cape Peninsula, Coastal Ramble in, 100
Carbide Running Short, 331
Carbonisation of Engine (letter), 61
Carbon Pencils, 408
Carburation at Starting, 367
— to Suit, 511
Carburetter Accessibility, 583
— Adjustment, 173, 200, 241, 319, 459
— An Exhaust-heated, 596
— Construction, 388
— Details (comment), 67
— Development, 270
— Drip Cup, 157
— Flooding, 507
— Heating of (letters), 61, 105, 128
— — the, 488
— Levers, Stops for, 322
Carborundum Valve Grinding Outfit, 458
Cauldron of War, 547
Caution, Drive Slower-ly, 467
Carrier Bags (comment), 25
Carson, W. H., Special Constable, 11
Carty, Capt. S. W., 336
Cartwright, H. E. (letters), 37, 480
Caveat Emptor (letter), 287
Century Motor Cycle, 2
C.E.T. (letter), 37
Chain Adjustment, 531
Chamberlain, E. C., 445
Champagne Sector (illus.), 117
Championship of S. Australia, 570
Changing Down, 340
— Gear, 364, 606
— — on a Runabout, 319
Channel Isles, No Petrol Restrictions in, 186
Chapman, F. P. (letter), 501
Charging Accumulators, 291
Chasing the Huns, 336
— — Senussi, 152, 239
Chater-Lea (illus.), 482
Cheaper Mounts Wanted, 589
— Post-war Motor Cycles, 599
Chemico Portable Vulcaniser, 404
Chemist (letter), 338
Chesher, Gunner J. (letter), 169
Chidley, K. V. (letters), 170, 502
Chile, Racing in, 113
Chinn, H. E. A., 420
Chinook (articles), 318, 345, 394, 454, 524, 585, 597
— (letter), 550
Christmas Greetings, 12
Clare, A Windfall for, 303
Claridge, B. H. W. (letter), 405
Clarke, A. (letter), 59
— J. T. (letter), 59
Clark, Nurse Margaret (letter), 16
Clayton's, T. Blythe, Little Son (illus.), 172
C.L.C. (letter), 80
Cleaning Plugs, 488
Cleveland Two-stroke, 560
C.L.S. (letter), 241
Clucatos (article), 206
Clutch, Adjusting a, 364
— A Stiff, 485
— Control, 360
— Slipping, 411, 605
— The Use of the, 460
Clutches, The Control of (leaderette), 321
C.L.V.C. 2872 (letters), 168, 243
Clyno (illus.), 395, 493
Clyno Sidecar (illus.), 54
— Spring Saddle Pillar, 112
Clynos for Russia, 426
Coal Gas, Starting on, 319
Cockburn, R. W. (letter), 339
Cohen, I., 146, 272
Cold and Gummed Engines, Starting, 408
Collier, H. A. (letter), 146
— H., and Sons, Ltd. (letters), 242, 429
Colonial (letter), 382
— Riders and American Machines, 183
Combination Drive or All-chain? 524
— of Trailer and Sidecar, 348
Combined Filter and Petrol Tap, 458
— Inlet and Exhaust Valves (leaderette), 321
— Lamp and Horn, A, 260
— Leg Shield and Coverall, 328
— Sparking Plug and Valve Cap, 342
— Valves, 324, 360
Comfort Accessories, 40
Commercial Motor Cycle Carriers, 277
Commissions for Motorists over Military Age, 239
Commonsense Magistrates, 473
Comparison, An Unfair, 258
Comparisons of Petrol Substitutes, 290
Competitions, 3
Complete Machines? Ought Firms to Make the, 500
Compression, Loss of, 605
— Reducing, 582
— Taps, Obstinate, 340
Concessions to Military Motor Cyclists, 185
— — Service Men (leaderette), 175
— — — — (letters), 218, 265
Contact Breaker, Sparking at, 200, 246
Control Levers, An Inverted View of, 597
— — Protecting, 582
Converted Double-seated Sidecar, 335
Converting the Gas Lamp, 445
Cooke, W. J. Clifford (letter), 381
Cooling, Internal, 345
— the Engine Interior (leaderette), 343
Co-operation, Advantages of, 541
Cooper, H. (letter), 60
Copper Cylinders and Pistons, 383
— Pipe, Annealing a, 340
— Radiators, 161
Corke, W. J. Clifford (letter), 603
Cork Factory, Motor Cyclist's View of, 382
Cornubius (article), 102
Countershaft Gear Box Design, 203
— Gears, Control and Ratios of (letter), 194
Courtney, W. E. (letter), 397
Cox, A. H. (letter), 381
C.Q.M.S. (letter), 218
Crank Case, A Heated, 460
— — Cleaning a, 532
— — How to Clean, 37
Creasey, J., 414
Critics, The, 116, 136, 156- 208, 232, 263, 274, 330, 358, 378, 401, 432, 438, 494, 526, 578
Crouch, A. P., 342
Crow, Jim, 479
Cunningham, Mrs. T. E. (letter), 504
Cnrious (letter), 455
Current Chat, 10, 32, 52, 74, 98, 142, 162, 186, 212, 236, 258, 280, 302, 331, 354, 374, 398, 426, 448, 470, 472, 496, 520, 566, 594
Cut Along (letter), 219
C.W.B. (letter), 311
Cycle and Motor Trades Benevolent Fund, 270, 521
— Car Redivivus, A, 249, 310
Cyclist (letter), 194
Cyclists' Touring Club, 427
Cyclospat Legging, 79
Cygnet Rear Car, 49
— — Cars at Los Angeles, 348, 349
Cylinder Boring in France, 192
— Distortion, 535
— Machining, 132
— Removing the, 435
— The Aluminium, 286
— Two Sparks in One, 183
Cylinders, Aluminium, 557
— Removal of, 264
Cymro (letter), 573

D.

Daimler Adoption of Aluminium Pistons, 556
— Premium for Graduates, 209
Dalby, L.-Cpl. D., 447, 518
Damages, Claiming, 554
Danish Motor Cyclists' Winter Sports, 359
Davenport, Sgt. W. A., 238
Davidson, Lt.-Col. A. E., 95
Davies, A. G. (letter), 603
— Lt. Howard R., 474
— Sec.-Lt. H. R., 376
Davis Carburetter, 150
Davison, W. B. (letter), 105
Day, C. Geo. (letter), 480
D.C.W. (letter), 170
Deakin, T. W., 342
Decarbonisation, 595
Decarbonising, 454
— Flat Twins (letter), 80
Decision in Important Case, 497
Decline of Second-hand Values (leaderette), 247
Decompressor, An Improvised, 445
De Lissa, Osborne (letters), 81, 147
Dennell Motor Cycle (illus.), 552
Delo, Mr. T. J., 187
Descending a Hill, 605
Despatch Rider (and his Leg-shields) in the War Zone, 259
— — in Egypt, 308
— Riders and Despatch Riding, 255
— — — Transfers, 377
— — at Poona, 395
— — attached to the R. Engineers, 447
— — Badge, 569
— — in Egypt, 518
— — — France, 351
— — Obtained, Sufficient, 419
— — of the 2nd Canadian Division Signal Co., B.E.F., 239
— — — — — — Signal Co., 519
— — on North-West Front of India, 376
— — The Pay of (letter), 381
— — Vacancies for, 308, 351
— — Variety of Conditions for, 362, 405, 459, 603
— Rider, The Work and Training of a, 464
Detachable Head Cylinder, 563
— Valve Seatings, 340
Deuchar, W. R. (letters), 219, 361
Difference between Skid and Sideslip, 578
Difficult Starting, 221
Disadvantages of a Long Magneto Drive (leader), 413
Discharge, Silent (letter), 195
Dismantling, 291
Dispensing with Metal Fittings, 521
Disposal of War-worn machines (leaderette), 41, 234
Distinctive Badge, A, 395
Distinguishing Marks, 591
Dixon, T. P., 192
D.M.S. (letter), 504
Doherty, Sec.-Lt. T. O. C. (letters), 310, 429
Don't Motor for Pleasure (illus.), 72
Double-acting Four-stroke, 473
Double-seated Sidecar, 335
Douglas, A Year on the Spring Frame, 276
— Engine, Air-cooling the Crank Case of a 530
— 4 h.p. and Sidecars, 594
— in the Desert, 26
— Lady's Model (illus.), 216
— M., 445
— Motor Cycle (illus.), 142, 328, 482
— Tips, 414
— Taking Down a 2¾ h.p., 507
— 2¾ h.p. Lady's, Road Test
— W., 388
Downie, A. M. R., 13
D.R. (letter), 288
D.R.'s attached to Headquarters Staff of H.B., M.G.C., 336
— in Egypt, Group of, 569
— of the Tanks, 336
Drew, Jack, 263
Drilling an Engine, 554
Drip Collector, A, 260
— Feed, 387
Driving from the Sidecar, 202
— Licences, 435
— — Age for (leaderette), 389, 423, 557
— — Granting of (letters), 126, 145, 170, 197, 218, 241, 265, 289, 310, 338, 361, 382, 407, 429
— — (leaderette), 87
Drying Up, 153, 431
Dry Sump, 535
Dublin Club's Meeting, 302
Dug-out Debates (article), 176
Duplock, Gunner C., 377
Duncan, R. J. (letter), 243
Dunlop Rubber Co.'s Dividend, 427
Dunkin, J., 482
Dutch Motor Cycle Trials, 14, 58
Dyer, C. S. (letter), 456
Dynamo Lighting for Motor Cycles (letter), 382

E.

Easting Screen, The, 600
East London Motor Cycle Club's (South Africa) Carnival, 79, 258
— — — — — — — — Outing for Wounded Soldiers, 313
Eastern Hemisphere, Riding Conditions of, 188
Easy Starting (letters), 105, 125
— — Device, 289, 582
Eccentric Hubs, 243
Economic (letter), 431
Economical Flooding, 224
— Two-stroke, An, 272, 406
Economy? 235
Edge Mud Shields, 115
Edmund, C., and Co., 310
— Spring Frame, Experiences of, 71
Edwards, Flight-Lt. G., 36
— W. F. Maitland (letters), 219, 288, 311

Efficiency and Lightness, 481
Egypt, Testing Motor Cycles in, 493
Eight Stroking, 341
Electric Bath Chair, 478
— Ignition Co. (1913), Ltd. (letter), 360
— Lighting for Motor Cycles, 60
— — from the Magneto, 541
— Tail Lamp, A Simple, 530
Electrically Operated Valves, 477
Electricity and the Motor Cycle, 258
Electrode, The Four Split, 559
E.L.I. Spring Seat, 113
Elieson-Carter Electric Bath Chair, 478
Eliminate Air Leaks, To, 224
Eliminating Weaknesses, 23, 223
Emerson, R. F., 395
Emery, W., 530
Empire Sidecars, 108, 124
Enfield, Economy of the 3 h.p., 222
— 8 h.p. (letter), 501
— Gear, Slip in ac, 269
— Russian Military Model, 211
— Sidecar, 6 h.p. (illus.), 17, 492
— Works, Fire at, 275
Enfields for the Russian Army, 191
Engine, A.B.C., 379
— as a Brake (letters), 265, 407
— Interior, Cooling the (leaderette), 343
— Loses Power and Stops, 460
— Misfiring when Hot, 412
— Running Hot, 199
— Shaft Gear, Overhauling, 154, 243, 310
— Vibration, 364
— will not Stand Magneto Advance, 579
Engines of the Future, 378
Engineer (letters), 288, 406
England, B., 408
English-French Motor Terms, 472
Engro Baildon, 534
Enlistment, The Terms of, 493
Enterprise (letter), 241
Epicure (letter), 312
Erratic Running of 4¼ h.p. Engine, 501, 527, 601
Esnault-Pelterie Valve, 324
Esnouf, R. Vernon, 145
Euk Easy Starter, 356
Euphrates, Armoured Cars in the, 238
Everest, E. P. (letter), 168
Excel Metal Guards, 248
Excelsior (letter), 217, 337, 528
— for Overseas, 296
— Twin 4 h.p. (illus. description), 14
Exhaust-heated Carburetter, An, 596
Exhaust Pipe, A Red-hot, 245
Exmoor, A Four Days' Excursion to, 512
Expanding Gear Ring, 139
Exports and Imports, 35, 141, 281, 399, 450, 570
Extra Air, 246

F.

Failure to Start, 220, 363
Faraday, Michael, A Great Englishman, 237
Farcot Valve, 324
Farm Tractor at Work (illus.), 296
— Tractors, 520
Far West, An Impression of the, 505
Faster Uphill than on the Flat, 511
Featherweight Runabout, 329
— Sidecar, Is it Practical? 515
— — Outfit, 580
Female Labour, An Opportunity for, 336
Fenn, A. G., 141
Fettpen (letter), 405
Fielder, Sgt. A., 12, 192, 395
Fins, Cooling, 366
Fire, An Uncommon Cause of, 398
— Brigades, Sidecars for the Use of, 247, 261, 266
Firing, Irregular, 485
— on One Cylinder, 340
— The Order of, 363
— Uneven, 199, 221, 246
Fisher, Gpl. C. H., 420
Fixing a Tariff, 370
Flat Twin Advocate, 447
— — A New Design, 423
— — at the Bar (letters), 18, 38, 81, 125, 147, 217
— — Engines (leader), 509
— — — Overseas, 503
— — Goes in America, 242
— — How it Wears, 323
— — Lubrication and the, 587
— — in Theory and Practice, 529, 575
— — New Large Size, 379, (letters) 406, 429, 456
— — The, 374
— — — Matchless, 541
— Twins, A Boom in, 403
— — — Few Questions, 267
— — and Spring Frames, 449
— — Even Firing on, 273
— — Forced Induction for (letters), 168, 194, 218, 243, 311, 338
— — Why they Start Easily, 323
Fleming, Mr. W. (illus.), 186
Fleet Street Traffic, 497
Fletcher, J. (letter), 310
Fluctuations in Second-hand Prices, 556
Flexible Copper Tubing, 270
Flywheel Magneto, The (leaderette), 175
— Position of, 375
F.N. Shaft Drive, 230
— 2¾ h.p. and Sidecarrier (illus.), 211
Football Match, A Remunerative, 449
Foot Pumps Advanced in Price, 174
Foreign Exports, 98
Forging *v.* Casting, 489
Forward Sparking Plug, 156
Four-cylinder, Timing a, 221
Four Days' Excursion to Exmoor, 512
Four-speed Gear Box Ratios, 203
Four-stroke (letters), 241, 407
Four Years Rider (letter), 194
Fowls on the Road, 486
Frame Design, 370, 405, 456
— — (leaderette), 533
— — Strengthening, 426
Francis, Capt. G. I., 192
Franklin Piston, 67
Freeman, A. M., 565
French Artillery Brigade, Motor Cyclists of, 307
— Despatch Riders (illus.), 52, 307
Frenchman's Ideal, 481
French *Poilus* at Picturesque Cateway at Verdun, 352
From the Cauldron (illus.), 544
Front Brake Details, 133
— Chain Adjustments, 391
— Hub Design, 202, 235, 264, 353, 603
F.R.S. New Mechanical Horn, 404
Fuel and Second-hand Values, 237
— More Motor, 284
— Scarcity, Overcoming, 303
— Supplies in France, 375
Fuller, W. A. (letter), 551
Funck, G., A.M.I.A.E., 561
Function, Design, and Construction of the Magneto, 190
Funnell, A. E. (letter), 382
Furguson, S. (letter), 589
Fusilier, R. (letter), 457

G.

Gamage, Eric N., 32
Gardner, John (letter), 381, 493
Garelli, Ing., 274
Garland, Victor, Chief Motor Mechanic, 377
Garrett, J. H. (illus.), 514
Garstone, A. J. (letter), 480
Gaspard, A. (letter), 481
Gatooma Motor Cycle Races, 13
Gaudie, W. R. (letter), 596
Gauzes, The Fitting of, 337
G.B. (letter), 505
G.D. (article), 469
Gear Adjustment, 485
— and Chain Adjustment, 319
— Box Clutch and Kick-starter Unit, 388
— — Ratios, Four-speed, 203
— Control Improvement, 270, 354
— Lever Tip, 534
— Ratio for a Lightweight, 411
— Ratios, 269, 386, 486, 575, 579
— — for a Hilly District, 460
Gears, Additional, 412
— and Cogs, 268
Generators, A Grumble at, 192
George, Cpl. R. W., 238
Germany Traded on our Ignorance, 213
G.G. (letter), 382
G.H. (letter), 287
Gibbs, Phillip, 519
Gibson, Hugh, 162
Gilbert, H. W. (article), 27
Gill, J. H. W., 342
Girl Government Clerks' Motor Cycles, 594
Girls Drive Gas Co.'s Sidecarriers, 373
Glencorse (letter), 383
Goat, The, A Perverse Beast, 538
Godden, Maj. F. W., 119
Good, J. F. (letter), 315
Goodwin, Mr. A., 302
— Will, 266
Government and Unsold Newspapers, 356
— Motor Cycles (leaderette), 151
— Our Waggish, 463
Gradients, Measuring, 53, 105
Graphite as an Engine Lubricant, 323, 435
— — Lubricant, 580
Graphite-laden Bearings, 344
Graphite, Use of, 153
Graphiting Overhead Valve Rockers, 583
Gray, A. L. (letters), 145, 289, 407
— G. T., The Late, 336, 351
Grey, H. C. (letter), 242
Green, E. R. (letter), 126
Greene, Cpl. T. E., 36, 493
Greenhalgh, Pte. A. (illus.), 176
Greenhorn (letter), 219
Greenwood, Pte. M. (illus.), 519
G.R.H. (letter), 80
Ground Clearance for Military Machines, 427
Group of Italian Despatch Riders, 475
— — Motor Machine Gunners, 474
Gudgeon Pin Fixing, 483, 551, 559, 603

H.

Haddock, Cpl. T. B., 376
Hall, 2nd-A.M. Neville, 140
Hamilton, C. J. M., 481
Hammond, W. (letter), 551
Hammerlock Cotter Pin, 144
Handford, A. (letter), 17
Handle-bar Binding, 260
— Design, 48
Handle-bars, Blacking the, 319
Hand Starter, A, 224
Hardee, Mrs., 122
Hardy, F. A., 472
Harley-Davidson (illus.), 411, 490, 525, 537, 604
— in a Raffle, 74
— Interchangeable Wheels, 510
— Motor Co., 270, 355
— M.C. Record, 52
— Timing of, 66
Harmond, G. (letter), 362
Hart-Davies, Ivan B., 239
Hartley-Smith, Mrs. M. (article), 134.
Harvey, O. E. (letter), 527
Hawes, John (letter), 126
Hay Motor, Evidently a, 479
— — — — (letter), 310
Hayes, E. (letter), 501
Hazlewood 5 h.p. (illus.), 480
H.B. (letters), 501, 602
Heather, 2nd-A.M. F., 239
Heating the Air, 341
Heavy Fuel Flashpoints, 281
— — Running on, 363
— Fuels, How a Lea-Francis was Adapted to the Use of, 204
— — Knocking on, 320
— Section M.G.C. Gunners, 211
Heavyweight Sidecar, The, 368
Hegan, Capt. H., 548
Hellier, Lt. M. J. (letter), 198
High Gear, Refusal to Run on, 292
High-tension Terminal, Water on, 582
Hill, Alick S. (Mayor of Coventry), 212
— B. Alan, 193
— H., 591
— Mr. Wilfred H., 186
— Sec.-Lt. B. Alan (illus.), 447
— Wilfred, 122
Hints and Tips for Motor Cyclists, 450
— to Novices, 416
Historical Event, An, 444, 573
History of Road Construction, 256
Hitchcock, M. (letters), 60, 126, 170, 218, 266, 289, 361, 457
Hitching, Pte. A. H., 255
H.M.B. (article), 48
H.O. (letter), 194
Hoad, Mr. A. S., 400
Hoadley, L. C., 414
Hodgson, Cpl. (letter), 573
Hodgkinson, Pte. N. C., 591, 602
Hogg, J. E. (letter), 104
Holton, E. B. (letter), 242
Holroyd, V A., and his Daughter (illus.), 440
Home Fuel Production? Why Strangle, 306
Home-made Sidecars, 548
— Windscreen, 596
Home-produced Fuels? Why Restrict, 281
Honesty the Best Policy, 280
Honour for the Men of the Tanks, 474
Horse-power, 460
Horswill, J. (letter), 80
Hot Air, 387
Houghton, 2nd-Lt. F. M. C., 279
Howard, R. G. (letters), 194, 241, 243, 265, 362
H.K.P. (letter), 267
Hub Design, 404
— — Front, 202, 235, 264, 353
— Gear Ratios, 363
— — Repairs, Record, 222
— — Wear in, 531
Hubs and Hub Protection, 503
— Eccentric, 243
— Waterproof, 278
Hubbard, E. J. E., 445
Huffam, Garden C. (letter), 362
Hulse, Mr. E., 335
Humberette (letter), 551
Humphries, R. (letter), 80
Huskinson, A. C. (letter), 337
Hutchinson, E., 388
HW 553 (letter), 315
Hyde, C. A., 98
Hygiene of Motor Cycling (article), 70

I.

Ideal Mount for a Lady, 573, 603
Ideas, Useful and Ingenious, 224, 260, 322, 366, 408, 414, 445, 488, 530, 534, 582
Identification Marks, 399
Imports and Exports, 35, 143, 281, 399, 450, 570
— of Motor Cycles, Australian, 505
Increasing Speed, 20
Incubus of the Sidecar, 476, 550
India, Motor Cycle in, 229
Indian (illus.), 331
— Flat Twin Aboard an Aeroplane, 419
— Impressions, More, 183
— on Heavy-Fuel, Running an, 530
— Powerplus (illus.), 31, 63, 80, 454
— Sidecar Outfit (illus.), 209
Induction Pipe Design (comment), 118
— — Heating of (letters), 126, 145, 168
Influence of Aero Engine Design, 461
Injustice, An, 236
Inland Revenue Licence, 572, 605
Inlet Pipes, Long (letter), 381
— Valve Lift, 220
Innis, W., 397
Inspection of Coventry Special Constabulary, 212
Insufficient Silencing, 555
Interchangeable Wheels, Harley-Davidson, 510
Internal Cooling, 345, 448
Inverted View of Control Levers, 597
Irish Enthusiasm, 525
— Motor Cyclists, News of, 518

Irishmen in the Services, 336
Iron Cement, 532
Irregular Running, 531
Is a Bathchair a Motor Car? 399, 473
Isochronous Speedometer, The, 171
Italian D.R.'s Award, 475
— Two-stroke Twin, A Neat, 274
Ivy-Precision 3½ h.p. Used for Driving a Lathe, 240

J.

Jackson, A. A. (letter), 362
— G. W. F., 395
— W. (letter), 407
— W. A. (letter), 311
Jack Stands, 28
Jaffa Transmission Guard for Morgan Runabout, 77
James (letter), 573
— 5-6 h.p. Twin, 571
— Two-stroke (illus. article), 138
J.A.P. Catalogue in Russian Language, 541
— Improvement, 190
J.B.T. (letter), 455
J.C.B. (letter), 479
Jet, A Variable, 322
— Fitment, A Variable, 488
J.F. (letter), 479
J.H. (letter), 565
J.H.M.R. (letter), 265
Joint, Making a, 390
Jones, G. S., 414
— Leonard R., 298
— Mr. L. R., 329
— Rev. W. A. (letter), 82
Johnson, Percy, 124
Joy Metal Leg-shields, 115
Journalist Piracy in W.A., 521
Juggernauts, O. C. (letter), 565
J.W.B. (letter), 549

K.

Kellog, Miss Shirley, 35
Kelway, W. I. S. (letter), 382
Kennedy, D., 601
Kent, R. Leslie, 238
Keene, Capt. Louis, An Interview with, 498, 522, 565
Kermode, R. C. M. (letter), 128
Kerosene, Good Results from Crude, 397
Kerslake-Smith, P. C. (letters), 311, 383
Kick-starter for Zenith, 60, 88
— Home-made, 169
Killerby, S., 314
Kirkee M.C.C., 123
Kit, Necessary and Unnecessary, 76
Knapton, L.-Cpl. E. (letter), 17
Konking (letter), 241
— To Prevent, 556
K.S.D. (letter), 528

L.

Lacey, Alex (letter), 361
Ladies and the Motor Cycle, 244
— Riding Attire, 479
Lady Motor Cyclists (letter), 16
Lamp, A Breakdown, 260
Lamplugh, S. A., Ltd. (letter), 339
Lancashire Motor Volunteers Route Test, 452
Lane, Sgt. H. R., 13, 278
Langelier Machine, 458
Largest Motor Bicycle, 269
Large Wheels, The Advantages of, 372
Larson, M., 534
Latham, R. R., 528
Lawson, R. E. Dain (letter), 198
L.C. (letters), 502, 528
Leaderettes, 1, 23, 41, 65, 87, 111, 131, 151, 175, 223, 247, 271, 293, 321, 343, 365, 389, 413, 437, 461, 487, 509, 533, 557, 581
Lea-Francis Adapted to the Use of Heavy Fuels, 204
Leaky Petrol Taps, 3
L.E.P. (letter), 241
Leg Shield and Coverall, Combined, 328
— Shields, Useful, 248
Legge, N. (letter), 481
Lees, F. C., M.A. (letters), 170, 196
Lessing, Dr. K., 284
Lester, J. H. (letter), 456
Letters to the Editor, 16, 37, 59, 80, 103, 125, 145, 168, 194, 217, 241, 265, 287, 310, 337, 360, 381, 405, 429, 455, 479, 500, 527, 549, 573, 601
Lewis Gun Mounted on A.J.S. Sidecar, 523
L.H.T. (letter), 218
Licence Duty, The Repayment of, 497
— Fee, Refunding, 532
— Fees, Rebate on, 213
Licences, 173
Light Alloys, The Uses of, 259
— Infantry (letter), 550
Lighting Dynamos, 439
— Regulations, 62
— Rules, 2
— Set, A Home-devised, 10
Lightweight Chain Guards, 259
— Transmission, 55, 80
— Wanted, a Good, 603
Lightweights and Detail Design, 187
— Road Vibration with, 415
Limitations of Lightweights, 449
Linden, Lt. P. J. (letter), 61
Lindsay, Capt. A. (letters), 38, 103, 310, 601
Little John (letters), 135, 219
— Major W. B., 95, 591
— W. B., 193
Lithgow Motor Cycle Club, 10
Liverpool Motor Volunteers in North Wales, 424
— Volunteer Motor Cyclists, 477
LK 1810, Peckham (letter), 61
Llewelyn, R. P., 279
Lloyd George's One Blunder (comment), 43
L.M.C., A Spring Frame, 300
Local Taxation Licence, 580
Lodge Sparking Plugs, 40, 86, 123
Lomas, H. (letter), 574
London Addresses, 248
— Motor Volunteer Corps, 426
London-Winchester Roads, 341
Long Stroke Engines (letters), 59, 73, 81
— — — (J. L. Norton), 29, 73
— v. Short Inlet Pipes, 267
Loosely, G., 445
Lorry Drivers, The Daring, Dashing, 565
— Train, 60 m.p.h. on a, 565
Loss of Compression when Warm, 319
Loughborough, T. W., 423
Low, Capt. A. M., 187
— Gears Desirable, 315
Lubrication and Atmospheric Pressure, 280
— — its Administration, 182
— — the Flat Twin, 587
— — — Two-stroke, 503, 508
— of Ultra Efficient Engines, 503
Lubricator, Valve Stem, 596
Ludicrous Derangement, A, 405, 549, 601
Luxurious Combination, 454
L.W.J.D., Nayasaland (letter), 183
Lyon, Miss Eliott, 525

M.

Machine, The Choice of, 387
Mackenzie, E. G., 13
Mack-Ivor, J. D. (letter), 287
Madeira, The Motor Cycle in, 586
Madeley, C. Stanbury (letter), 360
Macready, Sgt., 523
M.A.G. Engine Co. (letter), 218
— — (comment), 67
Magneto, Altering a, 291
— Adjustment, 174
— A New British, 566
— Drive, Disadvantages of a Long (leader), 413
— Drives, 303
— Failure, A Curious, 529, 550
— Hooter, A, 567
— Industry, All-British, 186
Magneto-lighted Lamps, 269
Magneto Lighting, 554
— Oiling the, 531
— Reversing the Direction of Rotation of a, 332
— Size of, 407, 429
— The B.L.I.C., 597
— The, 190
— — Flywheel (leaderette), 175
— — One Piece, 570
— Timing the, 340, 411
— Tip, The £5, 511
— Trouble, Curious, 246, 268
— Troubles, 436, 532
— Tune, 462
Magnetos, C.A.V., 174
— Manufacturers and Enemy (leaderette), 271
Magnets, Purchasing, 508
— Steel for, 340
Magnitude of British Motor Cycle Trade, 588
Makeham, Sgt., 376
Making the Motor Cycle Useful, 245
Manufacturers and Enemy Magnetos, 271
— Union Officers, 98
Manufacturing Permits Extended (leaderette), 201
— — Extension of, 213, 216
Mansfield, A. M., 385
— H. J., 50
— Lt. Ralph, 141
Maorilander (letter), 589
Mariani, E. (letter), 383
Markel Motor Wheel, 2
Marston, John, Ltd. (letter), 429
Mason, 2nd-A.M. H. W. (illus.), 72
Master Repair Outfit, 240
Martin, James (article), 181, 266
Matchless, Comments on the Post-war (letter), 219, 242
— Flat Twin, 541
— — — 5-6 h.p., 90
— Military Model, 540, 541
— Motor Cycle, 7 h.p., Trip on, 24, 490
— Post-war Model (letter), 124
May, Col.-Sgt. Southcomb, 140
— Lt. Frank H., 255
M.B. (letter), 407
M.B., R.N. (letter), 529
M.C.B., R.F.C. (letter), 194
M.C.C. Annual Meeting, 113
McEwen, J. H. (letter), 60
McGhie, L.-Cpl. W. I., 141
McGregor, D., 342
McIntosh, G. J. (letter), 217
McLean, Wm. (letter), 127
Mead, F. W., 342
Mechanical Horn for Motor Cycles, 342
— Pumps, Adjustment of, 280, 339
— System Show Up, Weaknesses of, 182
Mechanist (letter), 242, 407
Medical Categories, 351
M.E.I. (letters), 128
Membership Scheme, A Temporary, 213
Men Called Up, Best Use of, 53
Mercer, Ivor E. (letter), 61
Mesopotamia, Road Conditions in, 233
Metal Fittings, Dispensing with, 521
Metals, Institute of, 375
Methylated Spirit as Fuel, 508
Metro. Single-speeder (letter), 168
Middlesex Territorial Volunteer Transport (illus.), 17
Misfiring, 173, 405
— at Slow Speeds, 291
Miles Chemical Vulcaniser, 404
Military Camp, A Visit to a, 334
— Machines after the War, 398
— — Rough Usage for, 210
— Motor Cycling in America, 403
— — — — U.S.A., 475
— — Cyclists, Concessions to, 185
— Notes, 12, 36, 49, 72, 95, 119, 140, 160, 192, 210, 238, 255, 278, 307, 336, 351, 376, 395, 419, 446, 474, 493, 518, 548, 568, 591
Milk and Honey (letter), 603
Mills, Lt. J., 119, 163
Millar, E. H., 275
Million Pounds Overseas Trade, A (leader), 293
Milner, J. (letter), 601
Miniature Motor Cycles, 74
M-L Magnetos under Test, 250
M.M.G.S. Badge, 395
M.M.K. (letter), 267
Modernising an Ancient Model, 364
Mogridge, Lewis, 475
Monocar, A Featherweight, 433
— H.P. for, 269
Monster Motor Cycles, 386
Monkey Knut, A (illus.), 500
Montgomery, Pte. W. J., 548
Morcom, Mr. H. B., 303
Morgan Motor Co., Ltd. (letter), 500
— Runabout, Transmission Guard, 77
Morgans Obtainable, 174
Mortham, H. T., 549
Moore, R. F. (letter), 481
Moss, Sgt. P., 119
Motor-assisted Bicycles (letter), 194, 217
— Cycles, 264
Motor Bicar, 137
— Boat Patrol, In the, 192
— Cars for Hire, 520
— Cycle as an Aid to Press Photography, 472
— — Club of S. Australia, 355
— — in Burma, 184
— — — Business, 384
— — — Madeira, 586
— — Engines, Water-cooling of, 227
— — Fitted with Wireless Telephone, 496
— — Ladies and the, 244
— — Police in Australia, 10
— — Speed Events at Christchurch, 359
— — Storage, 543
— — The Early History of the, 472
— — — First to Fly, 375
— — — Utility of, 240
— — Thief, 53
— — Thieves, 550
— Cycles and Other Sports, 496
— — — Prices after the War (leaderette), 87
— — — the American Army, 236
— — by Rail, 121
— — Census of, 163
— — Dynamo Lighting for (letter), 382
— — for Despatch Riders, 405
— — — Newspaper Delivery, 211
— — — Russia (letter), 360
— — — the Disabled, 282
— — — — Lame, 139, 282
— — in the Wilds of Africa, 420
— — — Warfare, 569
— — Manufacture, 1
— — not yet Recognised by U.S. Army, 449
— — Rear Springing of, 180, 217, 266
— — Stacks of, 548
— — Used by Police, 374
— Cycling and Toothache, 118
— — Boot, A, 534
— — in the Balkans, 447
— — Scenes in Uganda, 446
— — Sea Lions (illus.), 553
— Cyclist D.R.'s of the Tanks, 141
— — in the Australian Bush, 19
— — Volunteer Combination, 377
— — Volunteers at Blackpool, 523
— — — Wanted in Southampton, 567
— Cyclists, America's Uses for, 212
— — and Aero Engines, 546
— — — National Service, 333, 357, 385
— — — R.F.C., 239
— — as Ploughmen, 427
— — Behind Europe's Trenches, 498, 522, 565
— — Disagree, When, 287
— — How they are Helping Uncle Sam in the War, 496
— — in India, 395
— — — Mesopotamia, 446
— — — Motor Volunteer Parade at Liverpool, 355
— — — the R.F.C., 603
— — 70,000 Army, 496
— — Volunteer Riding Test, 452
— — Winter Sport in Denmark, 359
— Drivers in the Infantry, 210, 278
— — — — — (leaderette), 151
Motoring Family, A, 419
Motorist's War Book (letter), 16
— — Work, A, 420
Motor Launch, A Motor Cyclist on, 493
— Machine Gunners, A Group of, 474
— — Gun Service, 474

Motor Spirit, A New, 567
— Trade and National Service, 53, 78
— Transport Volunteers, 262, 376
— Volunteers, 375, 426, 499, 506, 521
— — and the Wounded in London Hospitals, 228
— — A New Corps, 332
— — Recognition of, 77
— — Route Test, 452
Motosacoche, M.A.C.-engined, 590
Mottram, Reg. W. L. (letter), 288
Moulinie, Andre, 307
Mountain Climbing in New South Wales, 604
Mount Clarence, Ascent of, 214
Mudguard Clearances, 565
Mudguarding (letters), 60, 104, 197
— Question Again, 446
Mudguards, Cleaning, 243
Mud Plug, A Hundred Mile, 428
— Protection from, 114
— What is its Proper Place? (leaderette), 111
— — — — — — (letter), 197
Mullis, W. (letter), 59
Mundy, Rex, 193
Murphy, Leonard, M.I.E.E. (letter), 198
M.S. (letter), 288
M.T. Driver (letter), 479
— Officer's Comments, 565

N.

N.A.B. Spring Seat, 112
Names, Registration of, 209
Naphthalene Blocks (letter), 194
Naphtha, Running on, 319
National Motor Volunteers, Blackpool, 449
— — — in U.S.A., 553
— — — Liverpool, 15, 348, 355
— — — London Area, 123
— — — The Work of, 226
— Service and Motor Cyclists, 333, 357
Necessity Knows no Law (illus.), 171
Neish, Cpl. L., 352
Neumann, Miss Alice, 32
New American Designs, 2
New Bearings, Fitting, 532
— Hudson, 6 h.p. (illus.), 245
— Imperial Motor Cycles, 123, 450
— — Russian Models, 316
— — Spring Frame, 286
— Jersey M.C. Trial, 428
— Motor Cycles by Permit (leaderette), 111
— Rover Cycle Co., Ltd. (letters), 302, 382
— Speed Records in Australia, 250
— South Wales, Mountain Climbing, 604
— Tanks Filmed, 548
— Zealand, Racing in, 102, 517
— — Some Good Going, 315
Newcastle Motor Club, 53
Newspaper Delivery, Motor Cycles for, 211
Nias, Capt. A. N., 501
Nicholl, Lt.-Col. D. F., 193
Noise, Excessive, 220
— or Silence? 526
Noisy Motor Cycles in Australia, 357
Non-slipping Belt, 342
North, F. C., 278
Norton Engines (letter), 37
— 4 h.p. and Sidecar (illus.), 398
— J. L. (article), 29
— 4 h.p. (illus.), 74, 272
— Motors and Repairs, 122
— Refinements, 592
— War Service Machines, 262
Nortons, Big Singles for Overseas, 294
Not Derelicts, but 1916 Military Models (illus.), 210
— too Old at ——, 406, 480
Novel Rear Lamp (comment), 43
Novice (letter), 16
— The, 478
Novices, Hints to, 416
N.S.U. Gear, 341
Nye, R. L. (verses), 192

O.

Occasional Comments, 3, 25, 42, 67, 89, 118, 133, 153, 177, 203, 225, 249, 273, 295, 323, 343, 367, 391, 415, 439, 463, 489, 511, 535, 559, 583
Octagonal Metal Sidecar (illus.), 237
Oil Consumption, 194
— — Excessive, 531
— Cooling, 581
— Leakage, 412
— Leakages, 489
— Pool Arranged, 300
— Pooling of, 280, 300
— Pump, A Throttle Controlled Force Feed, 400
— Pumps for Australia, 600
Oilskins, Dressing, 320
Oil, Where does it Go? 489
Oiling a Magneto, 412
Olieslagers, Jan, 420
One of the Boys (letter), 217
One Power Stroke per Revolution, 471
On Leave, 593
O'Rafferty, J. C. (letter), 431
Origin, Year of (letter), 217
Osborne, R. E. (letter), 17
Oswin, John (letter), 145
Outlook, 74
Outside Flywheels, 60, 103
Overhauling an Engine-shaft Gear, 154
— — — — (letter), 310
— a 1914 6 h.p. Zenith, 326
Overhead Valve Engines and Tune (comment), 67
— Valves, 1, 438, 501, 516, 555
Overheating, 386, 485, 555
Overseas, A Voice from, 589
— Big Single Nortons for (illus.), 294
— Competition, 497
— Conditions and their Effect upon Design, 504
— Model, A Test of an, 296
— Models, More, 588
— Motor Cycles, 7, 92, 182
— Production, Handicapping (letter), 397
— Riders Home on Leave, 504
— — Opinions, 9, 93, 182, 313, 396, 503, 588
— Requirements, 601
— Trade, A Million Pound (leader), 293
Overtime Farm Tractor at Work (illus.), 296
Oxfordshire Motor Volunteer Corps, 280

P.

P. and M. (illus.), 192
— — — An Appreciation of the, 564
— — — Booklet, Review of, 174
— — M.'s in the Somme Area, 307
Paine, Capt. E. W. M., 339
Palestine, A Picture from, 518
Palmam Qui Meruit Ferat (letter), 310
Palmer Tyres, 174
— — 700×75 mm., 270
Lamplugh Pump, 34
Paraffin and Water, Running on, 366, 387
— Restrictions, 407
— Running a Two-stroke on, 435
— — on (letters), 291, 319, 329, 341, 430, 436, 531, 579, 605
— Vapour, The Weight of, 269
Parker, Lt. Reg. G., 140
— Miss M. C. (illus.), 135
Parson (article), 539
Parsons Valve, 325
Partejoie, G. W. (letter), 431
Parts, The Speeds of, 350
Patents, Abridgments of, 40, 86, 150, 174, 270, 277, 342, 388
Paterson, Lt. Cyril, The Marriage of, 278
Patterson, Charles S., M.B., M.R.C.S. (letter), 195
— C. S. (letter), 127
P.C.K.S. (letter), 289
Penang, An Old Machine in, 505
Penney, Chas. (letter), 479
Percival, W. Spencer, 140
Perfect Two-stroke Plug, 25
Permanently and Totally Disabled (letter), 601
Permit to Drive, 579, 606
Permits, Agents to Obtain, 213
— Extended Manufacturing, 216
Pervyae, The Heroine of (illus.), 216
Petroil, 320
Petrol after All, Six Months', 281
— — — Some (leaderette), 271
— Allotments (leaderette), 365
— — (letter), 405
— Allowances, 42, 53, 65, 78
— and the Daily Press Again, 473
— — — Press, 495, 528
— Committee, The, 415
— Consumption, 364
— — in Africa, 397
— Control Committee Announcement, 144
— — — System, 374
— Cooling, 529
— Dealers, Notice to, 167
— Distribution, A Suggestion for, 510
— Economies, Possible (leaderette), 533
— Economy, 602
— Famine, 281, 286
— for Parsons, 280
— — Sale, No, 472
— Gauge, 534
— — Float, Logged, 245
— Hotchpotch, 391
— in Paris, 354
— Licence, 339, 387, 460
— Licences, 32, 33
— or Paraffin (letters), 298, 362, 383
— Outlook, 280
Petrol-paraffin Mixtures, 144
Petrol Permit, Carrying a, 412
— Permits, 269, 412, 481
— — and Supplies, 501
— Pills, 222
— Position, A, 567
— — Suggested Refund of Licence Fees (leaderette), 131
— — The (leaderette), 437
— — What is the True, 389
— Prices, Fixed, 303
— Purchasing, 363
— Queries, 186
— Restrictions on Cars for Hire, 449
— Starting on, 322
— Stocks, 331
— Stories, 487
— Substitutes, 245, 268, 340
— — and Starting, 172, 199
— — Comparisons of, 290
— — Question of, 166
— — Testing, 187
— — The Use of, 220
— — — Ban on, 240, 259
— Supplies, 411
— The Storage of, 386
— To Prevent Waste of, 582
— Use of, 213
— Users, Warning to, 53
— Waste, 501
Petroleum Pool, 398
Phillips Magneto, Government Test of, 222
Phœnix Sidecars, Types of, 244
Picardy Pitt (letter), 575
Pidcock, C. W. (letter), 198, 217
Pillion Seat, A Child's, 445
Pilot Jet, A, 224
— — Control, 542
Pilots, Oversize, 280
Pioneer Journalism, 383
Pip-Emma (letter), 602
Piston, A Cracked, 486
— Design, Novel, 235
— Ring Pressure, 91
— Rings, Two-stroke, 203
Pistons, Air-cooled, 414
— Those Quivering, 211
Pivotal Joints, 388
Plastic Solder, 56
Plateau, M. de L. H. E., 352
— — — — — (letter), 194
— H. E., 575
Platinum Points, Fixing, 173
— — Trimming, 320
Plug, An Air-cooled, 488
— A Self-cleaning, 414
— — Sooty, 340
Plugs, 401
— Cleaning, 488
— Cooling of (comment), 42
Police and Number Plates, 448
— Traps near London, 501
Pooling of Interest, 472
Popular Paper, A, 574
Port Designs on Two-stroke Engines (article), 69
— — — — — (letters), 105, 195, 217, 241
Post-war Manufacture of Motor Cycles, 536
— Matchless, Comments on the (letters), 219, 242
— Motor Cycle, 46
— Models, 243
Potatoes (illus.), 354
Potential Buyers, Attention to, 354
— Overseas Markets, 313
Pot-holes, Tarring over, 472
Potts, Flight-Lt. J. F., 119
Pountney, J. H., 591
Power and Economy, 414, 551
— — Weight of Sidecars, 490, 528, 550, 574
— Lack of, 245, 292, 320, 364
— of a Motor, Calculation of the, 431
— Stroke per Revolution, One, 471
Practical Motorist (letter), 267
Pre-ignition, 268, 436, 486, 605
Preferential Treatment for Front Cylinders (leader), 65
Premier Motor Cycle, 3½ h.p., 139
— — — in Japan, 27
Press Photography, The Motor Cycle as an Aid to, 472
Preventing Waste of Petrol, 229
Prices in the War Zone, 12
Pro-Ally Sentiments, Proof of, 566
Progressive (article), 69
— (letter), 195
Progress, Wolverhampton (letter), 60
Prohibition in India, 8
Protecting Control Levers, 582
P.T.L. (letter), 405
Pulley Gear as Clutch, Using, 554
Pulleys, Removing, 322, 362
Pullin, C., Marriage of, 399
Pushing Motor Cycles, 127
Puzzled, 235

Q.

Questions and Replies, 21, 39, 63, 84, 109, 129, 148, 172, 199, 220, 245, 268, 291, 320, 340, 363, 435, 459, 485, 507, 554, 605

R.

R.A.C., 427
— Buildings, Future Use of, 99, 122, 142
Racecourse, An Original, 104
Racing in New Zealand, 517
R.A.C.'s New Name, 186
Radiating Fins and Aero Engine Practice, 107
— — Broken, 435
R.A.M.C., Capt. (letter), 361
Rasenluna, N. P., 359
Raynes, S., 534
Rear Springing of Motor Cycles, 180, 217, 266, 287
Rebate on Licence Fees, 213
R.E.C. (article), 530
— (letters), 196, 500
Recommended Routes, 64, 85, 110, 138, 149, 173, 200, 221, 246, 269, 292, 320, 341, 364, 387, 412, 430, 460, 486, 508, 532, 555, 580, 606
Record? Is it a, 273
Recruiting Closed for Motor Cyclists in R.F.C., 255
Recruits dealt with by *The Motor Cycle*, 336
Red Cross Motor Carnival in New Zealand, 359
Reducing Compression, 582
Redwood, Sir Boverton, 142
Reeve, L.-Cpl. S. A., 502
Refunding of Tax, 240
R.E.G. (letter), 265
Registration Act, New, 181
— of Names, 209
Reid, Cpl. G. C., 447
— Gordon C. (letter), 360
Reliability (letter), 502
Relph, W., 596
Repairing Pot-holes, 281
Repayment of Licence Duty, 497

Replacing a Stud, 322
Remagnetising, 220
Reminiscences, More Sporting (5th Instalment), 178
Removal of Cylinders, 264
Removing a Flywheel, 554
— Pulleys, 322
— Refractory Valve Caps, 265
Restrictions (letter), 266
Retrospects of a Rural Rider, 317
Rex Cantilever Suspension, 112
R.F.C. (letter), 311
— Motor Cyclists on the Somme, 307
— Mounts for the, 303
— Officers' Tunics, 281, 303
— Recruits, 239
— Sidecars for the, 301
Rice, Capt. B. C., 419
Ricardo, M. H. R., B.A., A.M.I.C.E., 235
Rider Troward and Co. (letter), 265, 504
Riding Against Time, 281
— Conditions of the Eastern Hemisphere, 188
— — — — Western Hemisphere, 304
Riley, Commander, 54
R.N. (letter), 431
R.N.A.S., 351, 376
Road Conditions, 332
— — in Mesopotamia, 238
— Construction, The History of, 256
— Map, A Useful, 594
— Rider (articles), 276, 476
— Speeds, 485
— Surveyors, Suggestion for, 543
— Taxation, 507
Roberts, G. A. (letter), 146
— Percy (illus.), 71
Robinson, Lt. F. A. (Eric), 49
Robb, Victor, 241
Roller Bearing Hubs, 399
Romyn, A. W. (article), 257
Ross, Mr. C. M., 315
Roosevelt, Sgt. Archie, 64
Roote, C. (letter), 219
Rotary-engined Motor Cycles, 53, 79
Rotary Engines, 546
Roundabout Cars, 497
Round Tower, Edge Hills, 297
Route to Avoid, 212
Rover (illus.), 430
— A Twin-cylinder Chain-driven, 299
— 3½ h.p. and Sidecar (illus.), 409
Rovers for Russian Army, 299
Royal Overseas Officers' Club, 236, 306
— Ruby Chain-cum-belt, 230
— — Motor Cycle, 99
— — Russian Model, 421, 426, 448
— — Safety Stays, 426
— Sussex (letters), 82
RS 1166 (letter), 430
Rudge, A Round Tour on a, 390
— Multi and Sidecar, 483
— Multis, A Batch Ordered for Belgian Government, 459
— Sidecar Model, Developments in (illus.), 440
— T.T. Direct Belt Drive, 231
Rudges in the T.T. Race, 460
Runabout, A Featherweight, 329
Run Round Sundon Way, 558
Russell, Cpl. Art., 568
— Cpl. H., 352
— Ronald S. (letter), 382
Russian Army, Enfields for the, 191
— — James for, 571
— — Matchless for, 540
— — New Imperials for, 316
— Government, Sunbeam for, 396
— Machines, Gear Boxes for, 497
— Military Models, 426, 594
— Royal Ruby, 399, 421
Rycroft, J., 60

S.

Saddle Cover, 366
Saddles on Spring Frames, 587
Safety First Film, 11
Sale or Return Still Exists, 374
Sampson Rotary Vulcaniser, 28
Sangster, C. G. B., 174
— C. T. B., 388
Sapper Sub (letter), 147
Sayer, Lt. L. (letter), 81
Sayers, C. W. (letter), 603
Saxpenny Motor Cycle, 572
Scare Press, 527
Schofield, F. E., 195, (letter) 407
Scoon, Flight-Sgt. R. S. (illus.), 119
Scooter in Australia, 374
Scott and Long Journeys (letter), 430
— Capt. A. M. C. (letter), 479
— — C. L., 420
— Lubrication, 507, 605
— Sidecar (illus.), 9
— Sociable, American Impressions, 10
— — (letter), 37
— — Road Test, 4, 22
— Triangulated Frame, 96, 115
— T.T. and Sidecar (illus.), 491
— Tuning a, 173, 200
Scutt, R. C. (article), 184
Sea Level, 7,800 Feet Above, 229
Scare Press, The, 550
Searle Tubes, 86
Second-hand Prices, 257, 259, 286, 332
— — after the War (leaderette), 41
— — Fluctuations in, 556
— Machines, Advice to Buyers of, 257
— Market, 570
Second-hand Values, Decline of (leaderette), 247
— — Declining, 236
Seizure, Almost a, 532
Self-cottering Valve Springs, Replacing, 415
Self-lubricating Leaf Springs, 28
Serclaes, Baroness de, 216
Service Men, Concessions to (leaderette), 175
Seventeenth W.D. Volunteers, 54
Seven Years' Reader of the Blue 'Un (letter), 603
S.G.W. (letter), 315
Shaft Drive, 449
Shaika Fort, On the Way to, 238
Shannessy, Lt.-Col. J. J., 72
Sharp, David (letter), 549
Sharples, Sgt. T., 449, 523
Sharvell, A., 534
Sheet Metal Forks, 450
Sheldon, Lt. W. H. H., 13
Shellshear's, Mr. W. G., Spring Frame, 207
Shield, Pte. Frank L. (letter), 169
Shifting Spanner, Use of, 27
Shock Absorbers, 576, 601
— from a Sooted Plug, 583
Shoda, T. (letter), 338
Sidecar, A Home-made, 237
— Ambulances, 525
— — in France, 95
— Another Use for, 374
— Attachment, The Selection of a (leaderette), 343
— Body, Fitting a New, 218
— De Luxe (leaderette), 365
— Driving from the, 202
— Featherweight, 515
— for Business Purposes, 434
— Manufacture in the War Zone, 420
— Mudguard Attachment, 473
— Outfit, Specification of (letter), 311
— Screen, A, 174
— Suspension, 342
— The Heavyweight, 368
— *versus* Cycle Car (letter), 61
— Weights, 496
— Wheel, Making a Cone for, 606
— Wheels, Springing the, 584
Sidecarring in Burma (illus.), 184
— near the Equator, 446
Sidecars for the R.F.C., 301
— — — Use of Fire Brigades (leaderette) 247, (letter) 266
— on Lightweights, 291
— Phœnix, 244
— The Power and Weight of (illus.), 490
Siffken, Sgt.-Major B. C., 193
Sikh (letter), 529
Silencer Efficiency, 265
Silent Discharge, 153, 195
— Motor Cycles (letter), 60
Silver, Mr. Tom, 589
Simple Starting Tip, 229
Simplification, 254
Simplifying the Two-stroke, 394
Simplex Power Unit (illus. description), 120
Simpson, W. A. J., 312
Simms Motor Units, Ltd., 174
Sims, Rear-Admiral W. S., 475
Sinclair, Sgt. J. H. (letter), 197
Singer Lightweight, 256
— 3 h.p. and Utility Sidecar, 357
Single *v.* Twin-cylinder Engines (letters), 16, 38, 59, 82, 103, 128, 146, 169, 195, 219, 337, 367, 480
— — Twin in Grease, 238
Singles, What Tank Despatch Riders Think of, 279
S.K. (letter), 549
Skids, Avoiding, 206
Sledging in Denmark, 359
Sleight, Pte. W. E., 80
Sleeve Valve Motor Cycle Engines, 431
Slipper Type Piston, 235
Slow Speeds, No Power at, 172
Small, Ed. A., 265
— Power after Overhaul, 486
Smith, Driver A. A., 475
— J. Clinton (letters), 339, 429
— S. (letter), 429
Soldier's Trip to Visit Wounded Brother, 537
Solo (letter), 550
Solvent Naphtha and Mixed Fuel, 453
Some Bicycle (letters), 381, 430, 455, 479, 502, 528
— Bike, 511
— Petrol after All (leaderette), 271
— Pluck (comment), 25
Sooted Plug, Shock from a, 583
South Australia, Motor Cycle Club of, 355
Spain with a Sidecar, In, 44
Spare Wheel, Carrying a, 459
Spares, No More, 275
Sparking Plug and Cooling Arrangement, 534
— — A Novel, 458, 500, 551
— — Condensation, 249, 335, (letters) 311, 383
— — Design, 501, 527, 574, 602
— — Position of, 200
Sparklets, 40, 150, 174, 222, 270, 342, 388
Special Hire Permits, 541
Speed, Changing, 320
— Limits, 575
— Records in America, 397
Speedie, John (letter), 267
Speedometer, Isochronous, The, 171
— Watford, 174
Speeds of Parts, The, 350
Spoke Holes in a Hub, Drilling the, 458
Spokes, Mending, 366
Sporting Reminiscences, More, 178, 392
— Trio, 448
Sportsman's Use for Motor Cycle, 63
Sphinx Manufacturing Co. (letter), 362, 500, 551
— Sparking Plugs, 40
Spring Fork (letter), 381
— Forks, The Mounting of (letters), 339, 381, 429
— Frame, British, 314
— — Campaign and *The Motor Cycle* (letters), 381, 479
— — Design, A French, 312
— — Flat Twin Brough (illus.), 442
— — L.M.C., A, 300
— — New Imperial, 286
— — Problem (letter), 310
— — Substitute, A, 182
— — What is a (letter), 198
— Frames Again, 373
— — and Frame Breakages, 519
— — A Side Issue, 583
— — Growth of, 542
— — More (letters), 207, 237, 289, 312, 373
— — Saddles on, 587
— Seat Pillars, 112
— Wheels, 371
Springing, 303
— the Sidecar Wheels, 584
Springs and Mudguards (comment), 133
Sproston, Cpl. A. J. (illus.), 536
S.S.D. (letter), 338
Stand Clip, New Design of, 275
Stanhope, Spencer, 543
Stanley Shock Absorber, 124
Starley, Mr. W., 450
Start, Failure to (letters), 194, 246
Starting Device, 530
— Difficult, 173, 606
— in Cold Weather, 173
— Mixture, A Strong, 267
— on Acetylene, 242
Steam Light Car, A, 280
— Tractor with Load of Timber, 297
Steel Cylinders of German Aero Engines, 155
— Radiating Fins on Iron Cylinders (comment), 118
Stephens, Miss M., 135
Stephenson, C. H. (letter), 195
Stepping Stone Sparking Plug, 362
Steerwood, F. T. (letter), 81
Stocks, J. W., 98
Stolen Sidecar, £5 Reward for, 354
Stone, Phillip, 575
Stone's, Mr. C. T., Spring Frame, 207
Stopped Cheque, 412
Stops for Carburetter Levers, 322
Storing a Sidecar, 580
— Heavy Fuels (letter), 287
— Petrol Substitutes, 258
Stratford Court, Excessive Zeal at, 10
Street Lamps (letter), 219
Strong, E. J. L. (letter), 16
— Starting Mixture, 287
Stuart, A. F. (letter), 431
Stud, Replacing a, 322
Sturdee, Mr. Thankfull, 472
Sturdy Midget, A, 217
Sturmey-Archer Gear Control (letter), 61
Suction Drip Feed, 507
Sub (letter), 362
Substitute, A Good, 222
— Tip, A, 258
— Using, 532
Substitutes, 487
— Analysis of, 212
— by Permit (leaderette), 223
— — — (letter, 265
— Home-produced, 332
— The Use of, 233
Sudden Pulling Up, 508
Suggestions for a Title, 209
Suggestive Signpost, A, 377
Summers (Dvr.), Jack W., 238
— L.-Cpl. J., 569
Sunbeam (illus.), 172, 384, 396, 495
— 8 h.p. Russian Military Mount, 396, 429, 495
— Military Models, 402
— Motor Cycle, 8 h.p., 57
Sun Cycle and Fittings Co., Ltd., The (letter), 287
Sundon Way, A Run Round, 558
Swaine, J. (letter), 527
Swinton, Col. E. D., 160
Swiss Despatch Riders, 590
Syme, Bruce (letter), 429

T.

Tandem Four-wheelers, 511
Tank Badge, A New, 474
— — Appreciated, 518
— Creator, 541
— Heroes, Honours for, 568
— Minor, 455
— — A Suggested Featherweight Mouncar, 433
— Repair, A Temporary, 606
— Sidecar (letter), 82
— Talk, 419
— The Price of a 278
— to be Used as a Delivery Van, 566
Tanks, 13, 119, 140, 160, 351
— A Tribute to the Men of the, 192
— The Boche, 447
Tail Lamp Connections, 225
— — How to Keep Alight, 408
— — Tell Tale, 245

Tanner Force-feed Oil Pump, 42, 86
Taplin, G. W. (illus.), 210
Tappet Adjustment, 383
Tariff, A Preferential, 399
— Fixing a, 370
Tate, A. H. (letter), 397
Taylor, Cpl. J. W. (letter), 405
— G. D. (reader's reply), 173
Taymans, E. (illus.), 97
— Madame, 211
Taxation, A Suggestion for Future, 455
Taxis Only for Hire, 473
Tax, Refunding of, 240
T.C., Falkirk (letter), 38
Teasdale, E. A. (letter), 310
Technical Sergt.-Major, R.F.C. (letter), 500
Ten Thousand American Motor Cyclists, 521
— Years Ago, 205, 228, 441, 546, 592
Terror of the Road, 102
Testing Motor Cycles in Egypt, 493
Test of an Overseas Model, 295
— — British Fuel, 515
The Goat—A Perverse Beast, 538
The Motor Cycle and its Readers, 257
— — — Spring Frame Campaign, 479
— — — 2d. (leaderette), 201
Thomas, D. (letter), 243
Thompson, A. E. (letter), 398
— H. E., 285
— M. M., 409
— Pte. E. M. (letter), 455
Three-cylinder Engine, 552, 567
Three Years' Motor Cycling, 451
Throttle-controlled Force-feed Oil Pump, 400
— Lubrication (article), 34
Through Feminine Goggles, 334, 482
— Zululand and Natal, 409
Thwaite, C. B. (letter), 337
Tilop (letter), 103
Timing an Engine, 199, 507
— the Spark, 268
— — Valves and Ignition, 606
— Wheels, Noisy, 221
Timken Roller Bearing, 404
Title, Suggestions for, 209
Tool Roll Tip, A, 260
Tomblin, H. A. (letter), 17
Track of War, In the (illus.), 193
Traction Engine *versus* Motor Cycle, 349
Trailer and Sidecar, Combination of, 348
Transmission Experiences, Some, 230
Travelling by Train, 426
Travers, Pte. J. M. (letter), 565
Trenches and Rest Billets, 473
— A Tip from the, 573
Trial Runs and Licences, 199
— Troubles, 393
Tricycles, Armstrong, 174
Tropics, An Old Machine in the, 183
Trollope, Flight-Lt. A. E., 474
Triumph 4 h.p. Sidecar Outfit (illus.), 184
— Gloria Sidecar Outfit, 555
— — — Optáts, 301
— Motor Cycles (illus.), 13, 33, 50, 152, 493
— 3½ h.p., 397
Triumphs for War Zone (illus.), 418
Tully, Minnie (letters), 527, 550
Turner, Cyril J. (letter), 405
Twin Engine (leader), 509
— Engines, 549
— Magneto for a Single-cylinder, 199
Twisting Handle Control (S. Sadler), 28
Two-speed Gear, Fitting a, 436
— — Wanted, A Sporting, 439
Two-stroke, An Economical, 272, 381
— Cleveland, 560
— Design, 481, 528, 549, 602
— Engines, 431
— — in America, 78
— — — Canada, 455
— — Port Design on, 168, 195
— — Two Sparks in, 411
— for Sixpence, 510
— Improvements, 342
— Lubricating a, 508
— Lubrication, 355
— Machines, Climbing Abilities of (letter), 339
— Petrol Consumption, 527, 573
— Piston Rings, 203
— Purchasing, 355
— Radial Engine (patent), 150
— Rattle, 354, 580
— Simplifying the, 394, 456
— Timing a, 507
— Tip, A, 488
— *v.* Four, 494, 502, 549
— — Four-stroke, 407, 457
— — — (letters), 241, 338
Tyre Experience, An Unusual, 187
— Imports Stopped, 449
— Mileage Cost Chart, 121
— Prices, 270
Tyres and Economy, 445
— Rise in Price of, 212

U.

Uganda, Motor Cycling Scenes in, 446
Ulster Centre, No Competitions in, 331
Umholoti River (illus.), 504
Unequal Lubrication of V Twins, 551
Uneven Firing, 199
Unit Construction, 388
Universal Model, The, 314
Unsatisfactory Running, 363
Unsold Newspapers, The Government and, 356
Upton, Gunner L. P., 279
Useful Leg Shields, 248
Use of Substitutes, The, 233
U.S. Troops for France, 376
Utility Machine, The, 463
— of the Motor Cycle, 240
— — — Sidecar, 435
— *v.* Fads, 463

V.

Vacheron, J. R. (letter), 457
Valve Arrangement, Concentric, 277
— Springs, Removing Self-cottered, 323
— Stem Lubricator, 596
— Timing, 172
— — on Twins, 66
Valves and Efficiency (letters), 61, 170
— Combined, 324
— Electrically-operated, 477
— Overhead, 438, 501, 516
— Pit? Why do, 415
— Squeaky, 246
— II. (The Critics), 470
Vandervell, Mrs. C. A., and Wounded Soldiers, 11
Vaporine Petrol Substitute, 174
Vaporiser, A. H. Burslem (letters), 38, 80
— An Efficient, 408
Vaporising Paraffin, 554
Variable Jet, A, 322
— — Fitment, A, 488
— Pulley Gearing, 270
Variety of Conditions for Despatch Riders, 279
Veloce, Ltd. (letter), 602
Velocette Two-stroke, The, 272
Verdun, Photographs of, 50, 193
Vibration, 220
Vickers, Archibald, Ltd. (letter), 287
— Bombr. W. H., 390
— Clyno Machine Gun Sidecars, 498
Vickers-Jones, Basil, 12
Visit to a Military Camp, 334
Vitesse, Engine Names, 268, 287
Voltage of a Magneto, 531
Volunteer Motor Cyclists, 455
— — — Gathering of, 375, 426, 448, 499
— — — — North Country, 478, 521
— — — in North Wales, 424, 425
— — — Liverpool, 477
— — — Orders for, 506
— — — Team Trial, 348
— — — The Work of, 226, 278, 351
— — — Wanted, 448
Volunteers at Blackpool, 472
V.S. Gear, Dismantling a, 436
Vulcaniser, A New Portable, 404

W.

Wadia, K. D. (letter), 243
Wakefield's, C. C., New Motor Oil, 174
Walker, H., 408
— — (letter), 17
— Miss May (articles), 83, 482, 558
— Mr. A. C., 435
— W. P. (article), 132
Wallace, L. (letter), 267
Wallen, J. H. (letter), 266
Walmsley's, Rev. A. M., Family (illus.), 183
Wanted, a Good Lightweight, 551
War-battered Machines Buried in Snow (illus.), 210
War, In the Track of (illus.), 193
— Meeting, Another Remarkable, 574
— Model Motor Cycles, Triumphs, 418
— — — Cycle, The Life of a, 308
— Service Machines, Norton, 262
— Time Mascot, 411
— — Necessity, A, 204
— Work and Lady Motor Cyclists (article), 134
War-scarred Motor Cycles, 544, 601
War-shattered Machines and the Public, 581
War-worn Motor Cycles, 547, 569, 581, 601
— — — The Disposal of, 234, 237, 581
Ward, A. (letter), 527
— E. C., 277
— Pte. L. (letter), 528
Warden, G., 483
Warming the Air (letter), 81
— Up, Slow in, 579
Warwick, G., 342
Wasp (article), 564
Waste of Petrol, Preventing, 229, 242, 582
Wasting Petrol, 520
Water-cooling, 344
— of Motor Cycle Engines, 227, 288, 383
Water Injection in a Petrol Engine, 37, 80, 104
— in Petrol, 374
— on High-tension Terminal, 582
Watford Speedometers, 174
Watkinson, Art.-Cpl., 548
Watson, Cpl., 523
— 1st-A.M. S. F., 255
— S. F. (illus.), 520
Weak Compression, Under-lubrication and, 508
Weaknesses, Eliminating (leaderette), 223
Welcome to a New Ally, 396
Weaver, W. R. (letter), 217
Welding, Facts about, 174
Welsh Mountains, A Jaunt to, 158
Western Australia, Road Racing in, 374
— Hemisphere, Riding Conditions of the, 304
Westwood, Driver, J. B. (letter), 397
W.F.C. (letters), 312, 406
W.F.W. (letter), 574
Wharfdale, A.S.C., M.T. (letter), 601
What is the True Petrol Position? (leaderette), 389
Wheeler, R. N. F., 279
Wheels, Spring, 371
— The Size of, 427
Which Type of Machine? 541
Whitaker, Frank, 210
Whitehead, H. R. (letter), 455
White, Miss Mary, 331
— Oil, 579
Whitham, S. A. M., 395
Whittick, R. B. (article), 20
Whitworth, S. F. (article), 233
Why Black? 225
— not Three Cylinders? 552
Wilde, A. H. (letter), 168
Wilkins, G. W., 74
— M. C. (letter), 16
Williams, Eric (illus. and article), 46
— G. (letter), 406
— R. (letter), 397
Williamson 8 h.p., 491
Willis Petrol-paraffin Carburetter, 28
Wilson, Major W. G., 541
— R., 530
— Capt. W. Frank (letter), 430
Windscreen, A Home-made, 596
Wiring a Lighting Set, 485
W.M., Workington (letter), 37
Women Despatch Riders, 472
Wood, A. (letter), 551
— Evan. J. (letter), 574
— Mrs. Stevens, 448
Woods, Frank M. (letter), 383
Woodhouse, Capt. J. W., 95
Woodman, Lt. T., 12
Woolf Graphite Lubricator, 89
Work and Training of a Despatch Rider, 464
World-wide Trade, 473
Worn Belt Pulley, 172
Wounded Soldiers' Outing (illus.), 598
— — — on the Mersey, 542
Wray, A. (letter), 38
Wright, Lt. J. L. (letter), 589
— Sgt. F. G. (Overseas letter), 314
W.T.P. (letter), 457
Wyatt, H., 601

Y.

Yarrow, H. (letter), 289
Year of Origin (letters), 217, 265
Youths for the R.F.C., 447

Z.

Zenith Belt and Chain Transmission, 231
— Overhauling a 1914 6 h.p., 326
Zephyr Motor Attachment, 164, 222

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The Manufacture of Motor Cycles.

SEVERAL motor cycle manufacturers not engaged upon war work have been notified by the authorities that the production of motor cycles must cease on February 15th next. This is serious for those firms who, after vain attempts to obtain war work, have specialised on Overseas trade in response to Government exhortations. The Motor Cycle Manufacturers' Union met last week to discuss the preservation of the motor cycle industry, and a deputation was appointed to wait upon Mr. Neville Chamberlain, the new Director General of National Service, with regard to the situation created.

The volume of our export trade in motor cycles does not seem to be generally appreciated by people outside the trade. Some glibly talk of stopping the production of motor cycles, since they are not of national necessity, but if those critics were to pause for an instant and examine the position, they would see that the British motor cycle industry is one of our national assets, approximately a million pounds worth of motor cycles being exported every year. Moreover, the products of British manufacturers predominate in many countries abroad, and this position has only been obtained after much spade work. To negative all this uphill work by stopping the production of motor cycles for export would mean that manufacturers would have to commence operations all over again, and in many cases would never be able to regain the position they once held. Not a man in the trade fails to realise, however, that the successful prosecution of the war is the first consideration, but is the supply of munitions still so inadequate that industries should be completely wiped out? As the position stands at present there is a million pound British trade in jeopardy—a trade, too, which showed every promise of rapid expansion as time went on. Again, it cannot be urged that the industry has not proved its worth in this great war, for it has rendered of its best in men, machinery, and money right from the commencement. Not only is the army able to obtain as many motor cycles as it wants from home sources, but the requirements of our Allies have been satisfied. Expansion of trade is impossible, but an important industry already considerably affected by war demands should be allowed, if the conditions at all permit, to retain its present slender connections with trade channels in our Colonies and Overseas Dominions and neutral countries.

Overhead Valves.

FOR maximum efficiency there is nothing to equal the overhead valve. This type of valve would figure much more frequently on touring machines were it not for the ever-present possibility of a valve head snapping and falling on to the piston with disastrous results. At any rate such is the prevailing opinion which has existed since the earliest days of motor cycles, when overhead valve breakages were more frequent than they are now. Latterly, however, with improved methods of design and a closer study of metallurgy, we have valves of practically unbreakable material, and engines of such superlative efficiency that valve breakages are becoming few and far between. This happy change of conditions, therefore, may reasonably cause designers to pause and consider whether the bias against overhead valves, which has been prevalent hitherto—and not without justification—may gradually disappear. As we have said, the overhead valve arrangement renders possible an engine design of the highest efficiency by reason of the fact that heat-retaining valve caps are dispensed with, and a simple spherical combustion chamber without ports or passages is obtained. That many of the difficulties at first found inseparable from this type of engine are now removed is proved by the marvellous reliability of modern aero engines.

An index to the advertisements in this issue will be found on the page facing the back cover.

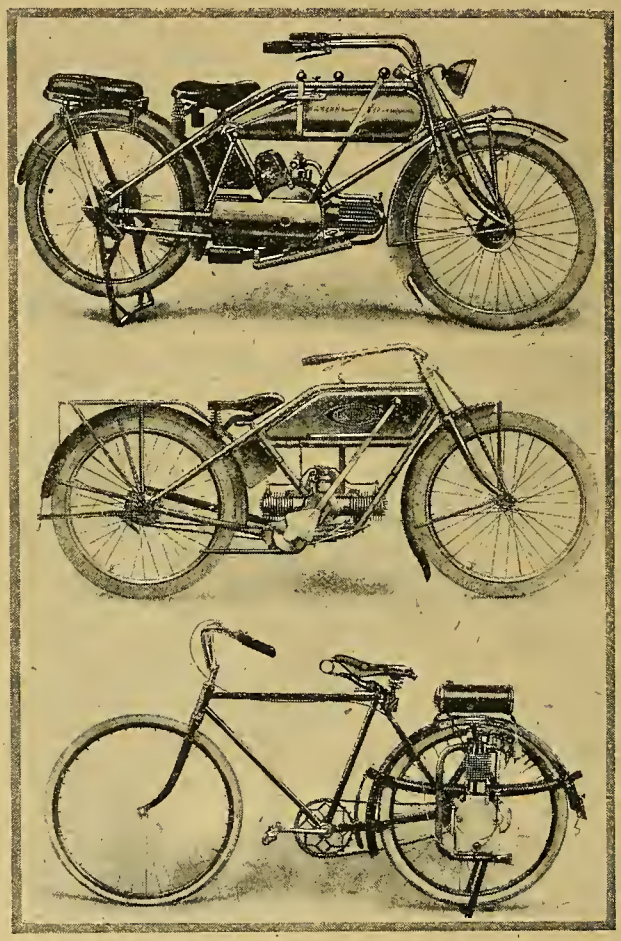
NEW AMERICAN DESIGNS.

A TRIO OF MOTOR CYCLES POSSESSING UNUSUAL FEATURES.

IT is not surprising to find that, the Indian Co. having started the ball rolling by introducing its new flat twin, other American manufacturers are coming forward with similar designs. At the time we described the Indian twin we expressed the opinion that more would follow. In the December issue of our American contemporary, *Motor Cycling and Bicycling*, we find descriptions of two more flat twins, which will make their appearance on the market about March, 1917. One will be known as "The Century" and the other as "The Bailey Flyer." Both machines possess one or two original features, and a few details as regards their construction may be of interest to our readers. The more striking design of the two is perhaps the Bailey, as among other novelties it is provided with shaft transmission—a type of transmission to which the even running of the flat twin lends itself.

The frame design is quite novel. The crank case forms the connection for the frame, as in many of our 3½ h.p.'s, thus allowing the front cylinder to protrude. This design enables a short wheelbase to be obtained, but the front cylinder appears to be in a somewhat exposed position.

The engine is quite a large one, viz., 84.5 mm. × 88.9 mm. = 920 c.c., and is said to develop between 16 and 20 h.p. On the top of the crank case the magneto and carburetter are mounted, and the three-speed gear occupies a position on the side of the engine, the drive being direct to the rear wheel by shaft and bevel gearing. The engine is started by means of a long hand lever at the side of the tank. The Century flat twin is very similar to the Bailey in appearance, but is a lightweight, scaling 130 lb. In this instance the transmission is by chain, while the magneto is incorporated in the flywheel. In this design also the engine starter is in the form of a long hand lever. The frame is divided in order to accommodate the front cylinder of the engine. The gear box occupies the ordinary countershaft position, the drive from the engine being enclosed.



(1) The 920 c.c. flat twin Bailey Flyer. Features are the shaft drive and novel frame construction.

(2) Century flat twin lightweight. The magneto is incorporated in the flywheel.

(3) The new Markel motor wheel. A company has been formed in the U.S.A. with a capital of £40,000 to manufacture this attachment.

A New Motor Attachment.

Another new American novelty described in the same issue is a bicycle motor attachment, a form of motor becoming widely popular in the States at the present time. This attachment is somewhat similar to the well-known Wall Auto-wheel, but is so arranged that, instead of simply attaching it to the side of the bicycle, it actually takes the place of the bicycle rear wheel. The motor is built into an auxiliary frame, so that the driving wheel takes all strains, and does not throw any weight on the bicycle. An ingenious springing device is fitted to take up road and driving shocks. It is stated that the power unit can be substituted for the rear wheel of a pedal cycle in half an hour.

THE NEW LIGHTING RULES NOW IN FORCE.

PART I. of the new Lighting Order of October 22nd came into force last Monday. The regulation referred to specifies that all vehicles, except bicycles, pedal-propelled tricycles, and hand-carts, must henceforward carry two white forward lights and a red rear light. Sidecars and three-wheeled vehicles will, of course, exhibit two forward lights *showing the width of the vehicle* and one rear light, while motor bicycles will meet the requirements of the law by the use of one head lamp properly screened and a red lamp in the rear. An electric lamp must not exceed six inches in the diameter of its lens or glass, and must not be more than twelve candle-power. In the case of acetylene lamps the size limit is identical, and the consumption must not exceed fourteen litres per hour. All lamps but those having no lens fronts and burning oil or paraffin must be screened with tissue paper.

Occasional Comments by "Ixion"

American Factories in England.

IT is already clear that the American trade expects (*a*) a temporary continuance of prohibition after the war, followed by (*b*) protective tariffs; and that the usual retort to such trading methods, *i.e.*, the establishment of new factories inside the prohibition or tariff wall, is to be adopted. This fact settles the question of "quantity" production in this country. Scientific repetition work is undoubtedly going to be applied to the production of motor cycles and motor cars in England, and a new factor of far reaching influence will appear in our industry. It is too early to prophesy with any pretence of accuracy as to what its exact effects will be. Suppose, for example, that a Hendee factory is erected in Great Britain or Ireland (if Mr. Wells will allow me to use his firm as a purely imaginary illustration). It does not follow that British-built 7 h.p. Indians will sell here for £55, which is their market price in the States. That figure depends on four main factors, presumably: the size of the output; the cost of labour; the cost of material; and local charges, such as rent and rates. If the Hendee Co. erected a factory here to dodge, let us say, a post-war import tariff of 33%, it would pay them to do so if the four factors named above kept the price of British-built Indians up to the pre-war figure for imported Indians. Nevertheless, any immigrant American firm is likely to sacrifice an immediate increase in profits to the chance of a tremendous increase in sales, leading ultimately to far bigger profits. In other words, it is on the cards that our best single-cylinders may soon after the war have to compete with the best American twins, and that at an appreciable disadvantage in price. For solo work our riders may mostly prefer the British single to the American twin, as has always been the case; but sidecar work is another pair of shoes altogether.

What about Competitions?

WE must further remember that competitions constitute a form of advertisement which has always had a great influence on our public; and that American machines have sold with comparatively little recourse to competition successes in England. I do not think, for example, that either the Harley-Davidson or the Henderson has ever scored in serious competition over here, or even competed. But the Americans are splendid hands at competition work. In the past, with the single exception of the Indian, they have given our competitions rather a wide berth. But they will all but swamp our competitions if they establish factories over here. They will have the men and other facilities ready to hand, in the way that a small London importing depot could never have. Their increased sales, aided by their familiar business methods, will supply them with large bands of crack sporting amateurs. Our old established factories will have to revise their entire programmes pretty radically to meet all these threats. I am by no means pleading for the adoption of Yankee methods by our trade. Our trade can make, and will continue to make, better machines than America has ever made yet. I suppose the simple fact is that we shall have to effect a certain compromise between our old ideal of "quality" production and the typical Yankee notion of "quantity" production; and that the home and the overseas trade will profit accordingly. But if too large a percentage of our firms stumble blindfold into the rather thorny thicket that lies ahead, they will meet rough times, and will emerge singing Kipling's Boer War ditty:

"We have had no end of a lesson;
It has done us no end of good."

Leaky Petrol Taps.

THE "petroil" system of lubrication attracts much adverse criticism, but it possesses one undeniable advantage in that its greenery-yallery stains infallibly draw an owner's attention to any petrol leaks. I was denouncing the modern petrol tap in rather disgruntled terms the other day, when a friend retorted that petrol taps had leaked as a class since the beginning of time, but that nobody knew it until petroil lubrication coloured the leaks and made them visible. I think I shall take to dissolving a small packet of aniline dyes in my petrol in future whenever it is used on machines undisfigured by the petroil system. Anyhow, the petrol taps of my last three new machines have all leaked sadly, and until the other day I was unaware of a real cure. Grinding them does not seem to make any difference. In one case I found that the leak was not really along the plug of the tap, but was located at the joint between the tap and the tank, and a new lead washer, plentifully besmeared with soap, effected a remedy. In the other two cases a cure—which may, or may not, prove permanent—was obtained by using a new "petrol stop" outfit made by the Chemico people. It is a formidable looking apparatus, really intended for tank leaks; but, mercifully, the modern tank does not leak unless you sideslip and jab one grip of a racing bar through the side panel. The aforesaid outfit consists of paste for caulking any petrol leak; tin angle plates for fitting over the paste, surgical bandage for lashing the plates in position, and shellac varnish for anointing the outside of the bandage, and so keeping the paste dry. Well, I removed the plug of the leaky taps, pushed a dobbet of paste into the taper end of the barrel just beyond the fairway used by the spirit, jammed the plug back, lashed the whole with the bandage, and anointed it with shellac. I cannot now shut the tap, but at any rate it does not leak. Till I strike a new and better make of petrol tap, I must adopt this untidy procedure. The Chemico dope appears to be petrol proof and adheres to the faulty place much better than yellow soap, which has previously been my sole specific for such jobs.

Road Test of a Scott Sociable

Over Yorkshire Hills & Dales in Drenching Rain

IN our issues of July 27th and August 3rd we gave the first full technical description of the Scott three-wheeled sociable, and we have now been privileged to make a practical and thorough road test of this machine, which is of interest not only on account of its ingenuity and originality of conception, but because it may be regarded as a scientific and engineering attempt to bridge the gap between the motor cycle and the light car. The aim of the inventor has been to retain the few but undeniable advantages of the sidecar outfit, while giving car comfort, protection, and rigidity.

The price of the ultimate machine cannot, as yet, be decided, and we can only say that the cost of manufacture compares favourably with that of machines sold in pre-war days at £100.

In testing this machine the following questions were borne in mind as of foremost importance: What are the distinct advantages of the sociable as compared with the luxurious sidecar outfit? Will the motor cyclist, in search of comfort and luxury, accept the Scott Sociable as a convenient stepping-stone between motor cycle and car? To what extent will the new vehicle appeal to those who demand something more on car than on motor cycle lines? Our candid opinion as to the behaviour and running of the machine will prove the easiest and, perhaps, the most convincing way of answering these questions.

Surprising Mobility.

On emerging from the works, Mr. Scott informed us that the engine required warming up before taking the road, and this process was carried out in the restricted area of the factory yard. The machine was run on middle gear at a brisk 10 m.p.h.; figure "eights" and narrow circles were cut, and the yard being at a decided slant, we experienced some qualms as to the likelihood of the sidecar wheel lifting. Nothing of the kind happened, however, and our tracks in the soft ashes showed very little indication of side-slip. Indeed, it seemed practically impossible to cause the machine to skid, and this amazing performance, which effectively warmed up the engine, reassured us as to the stability of the vehicle as compared with a sidecar outfit. No sidecar we have ridden could have performed such evolutions without either skidding abominably or lifting the sidecar and passenger clean over the machine.

SPECIFICATION OF MACHINE:

Vertical Two-stroke (Rotary Valve) Water-cooled Engine, 76·2 × 63·5 mm., Three Speeds, Shaft Drive.

Triangular Frame with Nut and Bolt Fixings.

Bell Crank Coil Springing Fore and Aft.

Detachable and Interchangeable Disc Wheels.

Owing to the castor wheel steering, a reverse gear would be a dangerous inclusion, and our departure from the works further demonstrated the fact that a reverse is not really necessary. The machine can be pushed back a yard or two with ease, and it can be turned in such narrow compass that manœuvring out of difficult corners is as easy as with a motor cycle, while the direction of travel can be reversed on the narrowest of country lanes.

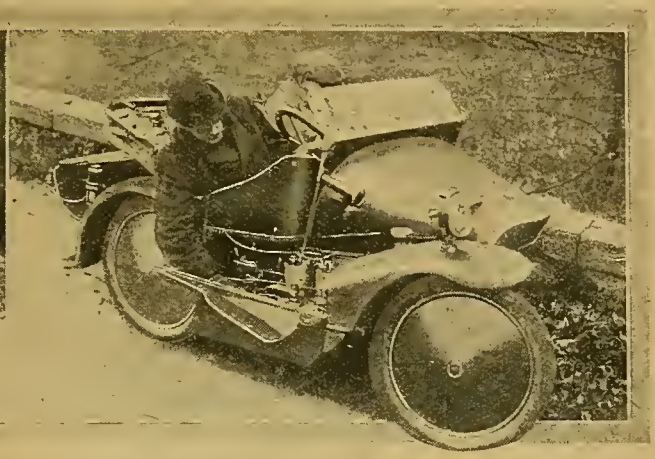
Protection from the Weather.

From Bradford we made our way over the moors to Ilkley *viâ* Baildon village, this mountainous route including one or two climbs as stiff as anything encountered in the ordinary course of touring. The climb through Baildon village was taken on middle gear till the final corner was reached, when it became necessary to drop into bottom.

A miserable drizzle had set in, and, halting by the old stocks, we decided to erect the hood. For the remainder of the day we left the hood up, travelling in the greatest comfort, in spite of sleet and atrocious roads. The glass screen of the sociable is about eight inches wider than that of a well-known make of light car, so that both driver and passenger are afforded excellent protection. A foot adjusted ventilator is provided for admitting warm air into the body from the radiator, while a handy little tray for gloves, pipe, matches, etc., is fitted in the dash. Nothing more snug, even in bad weather, could be desired.

Between Baildon and Ilkley we stopped and reversed our direction several times for the benefit of the photographer, and here we were able to appreciate the great convenience of the seat-starter. From the driver's seat one has complete control of practically everything—the petrol can be turned on, the carburetter flooded, plugs or the contact breaker examined, and finally the engine started by a pull at the handle, so that it is unnecessary to dismount for anything short of tyre troubles.

(1) Detachable and interchangeable wheels are provided. The self-operating jack shown is a useful accessory.



(2) Showing the accessibility of the power unit. Minor adjustments may readily be made from the driver's seat.

Doctors particularly will appreciate the unique advantages of this machine over the light car, its small points of convenience being specially attractive for all-weather stopping and starting work.

A Freak Gradient.

Baildon Dell is a really severe gradient, and, descending the hill, we found the brakes individually sufficient to skid either rear wheel. When applied together a very abrupt stop could be made, though both brakes were progressive and sweet in action.

Reversing our direction at the foot of the hill we essayed the climb, and on its low gear of 12 to 1 the machine proved irresistible. It could be driven at "tick over" speed on the steepest portions of the gradient, bounding forward at the least touch of the accelerator, and it was evident that the machine would climb practically anything where wheel grip was possible.

From Ilkley we made our way up the valley of the Wharfe to the picturesque village of Burnsall, Mr. Scott retaining possession of the wheel in order to demonstrate his machine to the best advantage. Snow, slush, and ice were encountered on the tortuous and hilly road, the conditions generally being against favourable demonstration. On this run our average speed worked out at 23 m.p.h., and we would put the maximum level road speed of the vehicle at 40-43 m.p.h., though both Mr. Scott and Mr. H. O. Wood claim to have attained over 50 m.p.h.

The Weight Question.

As regards road speed, it must be borne in mind that the weight of this experimental vehicle is very much higher than necessity demands, being exactly 7 cwt. This is partly owing to the fact that, aluminium being unobtainable, sheet steel is used throughout the body, while at no point has any effort been made to reduce weight, an extra load being desirable for test purposes.

In comparing the road performance of the vehicle with a sidecar outfit of 5½ cwt., we must therefore imagine the sidecar outfit to be similarly loaded, *i.e.*, carrying a load of four male passengers. Very few sidecar outfits would be capable of putting up an equal show with this load aboard, and in his final model Mr. Scott confidently expects to reduce the weight of the vehicle by at least 2 cwt.

The great weight of the machine was indicated by the falling off of speed on gradients. On the level it is as fast as a good sidecar outfit, but the latter would beat it on hills.

A Night Ride and Tyre Troubles.

After dinner at Burnsall a return was made through sleet, mud, and fog, and every degree of road and atmospheric unpleasantness, the hot air ventilator, the windscreen, and the hood being much appreciated. Such a journey by motor cycle would have been distinctly unpleasant, but the "home comforts" of the little sociable took no account of road and weather.

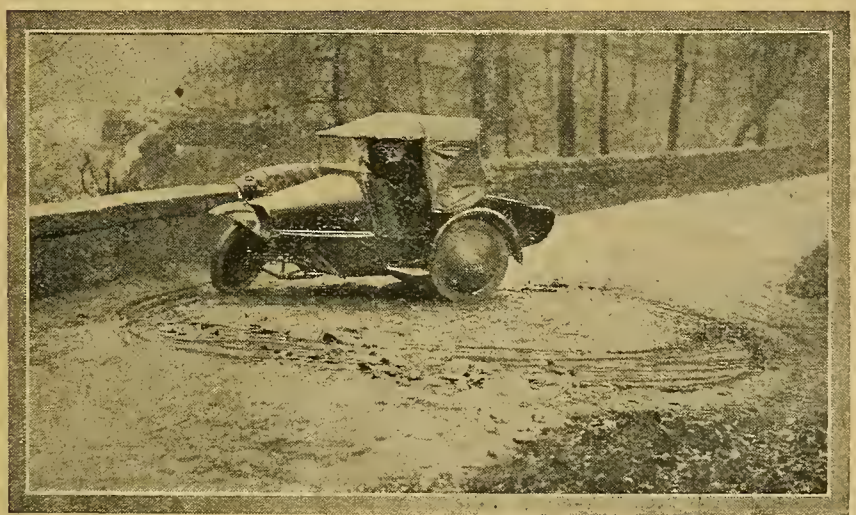
At Shipley the sidecar tyre burst with a loud report. A friendly policeman gave us the benefit of his flash lamp, and fitting the spare wheel was a matter of a few minutes only.

The machine was put away for the night in an unheated motor house, frost not being feared, as the aluminium water jackets were sufficiently elastic to allow for expansion. Petrol consumption for the day worked out at just under 50 m.p.g., which was agreeably surprising, considering road conditions and the weight carried.

The following morning we ourselves took control of the wheel, and from the outset found driving extremely easy. Being accustomed to car control, the right foot clutch and left foot accelerator at first required thought, but gear changing was so easy that a few minutes sufficed, and soon we were handling the machine over greasy setts in the Bradford traffic.

Efficient Springing.

The machine was first tried with passenger aboard, then solus. We had already formed an opinion as to the efficiency of the springing, and now that



NO NEED FOR A REVERSE.

The "handiness" of the Scott Sociable was exemplified on a comparatively narrow road, a complete circular turn being made without the least sign of wheel lift. Note angle of front wheel.

Road Test of a Scott Sociable.—

we came to sample the very worst productions in the way of West Riding pot-holes this opinion was amply confirmed.

The springing system really leaves nothing to be desired. It is far and away ahead of anything we have sampled in the way of sidecar or light car springing, which is a bold statement. Over a road of ordinary war-time pot-holes one can bowl ahead at full speed without the least discomfort. The body merely rises and falls with a steady swinging motion, there being no "dead stop" and sudden jar on encountering a bump of unusual severity.

Driven solus, the reaction of the springs was certainly more rapid than with passenger aboard, but we found that the sidecar wheel still showed not the slightest tendency to lift. Taken generally, Mr. Scott's system of bell crank springing, with coil springs which can be replaced in a few seconds in case of breakage, would appear to be a solution to the springing difficulty in connection with light vehicles.

Minor Points.

One or two minor points we would like to mention in connection with this test. In reply to a correspondent, we would say that the machine showed not the least difficulty in mounting from the camber of the road under the most trying conditions.

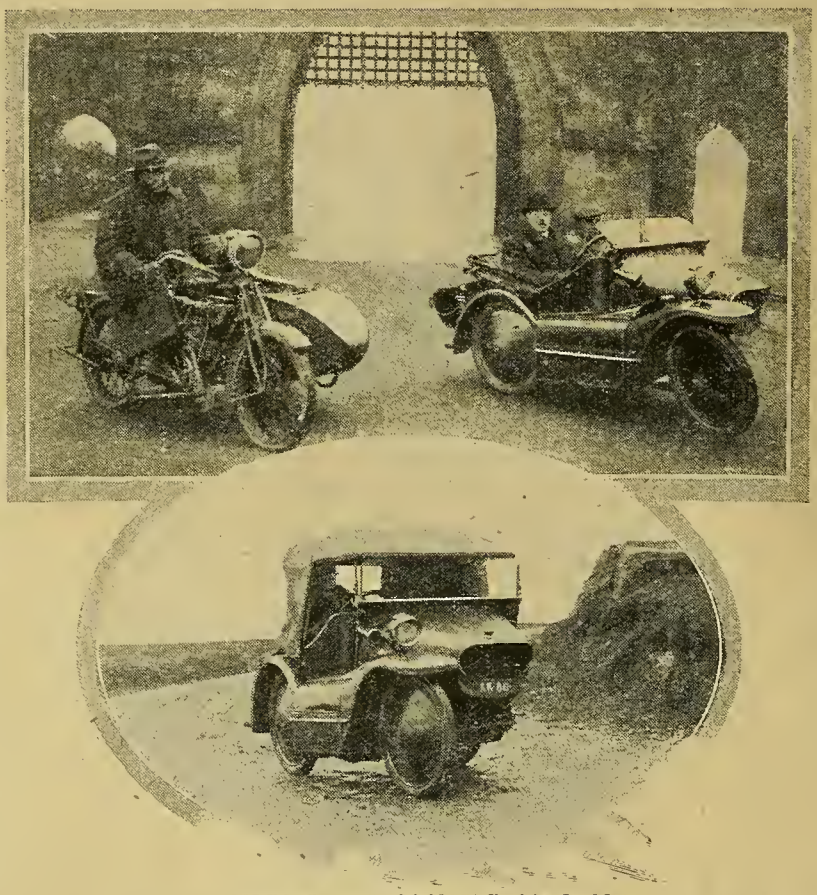
Roller bearings being used throughout, the engine can be run on an absolute minimum of lubrication. We noticed particularly that no smell of oil or hot engine is detectable, even when climbing long hills on bottom gear.

The steering is quick and effective, but on the crown of the road a distinct pull is felt towards the low side. This pull is particularly noticeable when descending gradients with the throttle closed, the idle engine then having a braking effect on the driving wheel, which tends to slew the machine to the right. Again, if the foot brake (sidecar wheel) be suddenly applied at speed, a strong pull to the left is felt, and it takes some little time to become used to the effect the brakes have upon the steering, which at first is somewhat tiring. One soon learns to use the brakes to the best advantage, however, and this is the only point which, during our test over the Yorkshire hills, appeared to us likely to present difficulty to the beginner.

The Power Plant.

The engine is a fine example of skilful and ingenious designing, which any practical rider would take a pleasure in maintaining, but though it is admirable as an engineering production, we are inclined to think that the man with no mechanical knowledge might fail to appreciate its merits. Half the secret in maintaining the tune of a twin-cylinder two-stroke lies in equal compression, without which the power falls off in a most astounding manner. Keeping an engine of this sort in concert tune is a matter of hairbreadths and mechanical judgment, but, since there is an ample reserve of power, the unmechanical rider would probably be quite content with mediocre tune. So far as our experiences go the engine is quite reliable.

The only other point we would criticise is the transmission, which, though remarkably sweet as regards the propulsion of the machine, is distinctly on the noisy side. Whether this noise is caused by imperfect gearing, or is simply owing to verberation on the steel body, which comes directly in contact with the gear box and the bevel casing, it was difficult to decide, but there was no doubt that the steel body had the effect of exaggerating the noises, which were most noticeable when the hood was erected.



SIDECAR AND SOCIABLE COMPARED.

(Top) A Matchless sidecar photographed beside a Scott Sociable. It will be noted that the riding position of the sociable is much lower than in the sidecar, and that its size is less than one might suppose.

(Bottom) This view emphasises the unconventional design of the Scott, as it was taken from a low viewpoint.

The New Model.

The lines of the new model are already decided upon, and Mr. Scott is confident that his alterations will remove the noise nuisance. In the first place, the engine is to be brought clean outside the body-work, while the cylinders are to be inclined outwards, thus providing still greater accessibility, and giving more room for the driver. The body is to be an independent and complete unit, constructed of three-ply wood—an air-tight structure, which is simply dropped into the frame, and can be removed in a few minutes.

A spiral bevel is to be used in place of the ordinary mitre bevel for the final drive, this being a compromise between the silence of the worm drive and the efficiency of the bevel drive.

For the interest of designers we would state that the wide field covered by Mr. Scott's invention is indicated by the official acceptance of the following claims:

(1.) Triangulated chassis and the more approved forms thereof, as applied *(a)* to *any* vehicle, and *(b)* to the three-wheeled type.

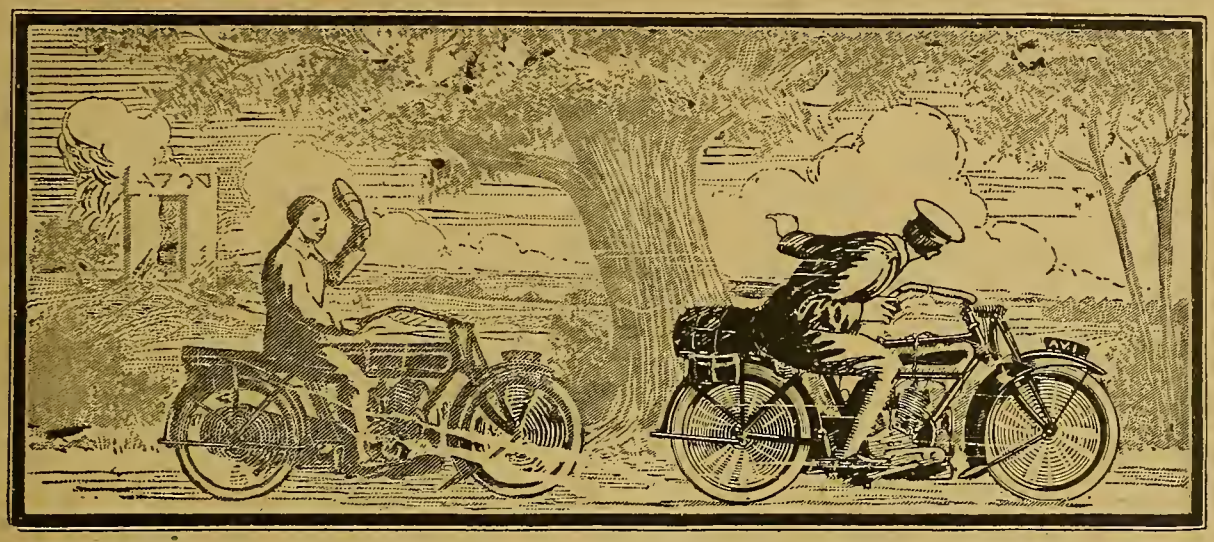
(2.) Various described alternative forms of chassis covering practically every type—as applied to a three-wheeled vehicle of the motor bicycle and sidecar type, in which all the wheels are offset, with front and back wheels approximately in alignment, and the engine located between these two wheels.

(3.) Front wheel bracket suspension, and alternative forms of rear wheel springing and control, as applied to three-wheeled vehicles.

These claims, it will be observed, deal more particularly with the frame design of the machine, and it will be recalled that the frame is built up from a number of eye-headed tube lengths, nut and bolt fixings being employed in place of brazed junction lugs. In case of accident a damaged tube can be removed and a spare telescopic tube put in its place.

This system of frame construction very much reduces production costs, while it eliminates the likelihood of frame breakage, such breakages generally being due to a tube having become burnt during the brazing process.

H.M.B



¶ The tourist or racer of yesterday is the despatch rider of to-day. He is naturally a connoisseur of the things that make motor cycling successful — and he welcomes such trusty equipment as Avon Tyres with lively recollection of "services rendered" in the good old days before the War. Sometimes he is good enough to write us — as, for example, the following from an A.S.C. driver at Zagazig, Egypt :—

¶ "Before proceeding to Ismailia I was stationed at Alexandria, and for two months I rode a 'Douglas' motor cycle fitted with Avon tyres. The roads were of the roughest — cobbles, sand, etc. — but, despite the hardest wear and tear, I experienced no trouble whatever with the tyres.

¶ "My work was delivering despatches, and the machine was very seldom at rest. No matter what part of Egypt I have been to, I have always found the greatest reliance is placed on Avon tyres."

AVON TYRES

Full illustrated Catalogue free from —

Avon India Rubber Co., Ltd., 19, Newman Street, Oxford Street, London, W.

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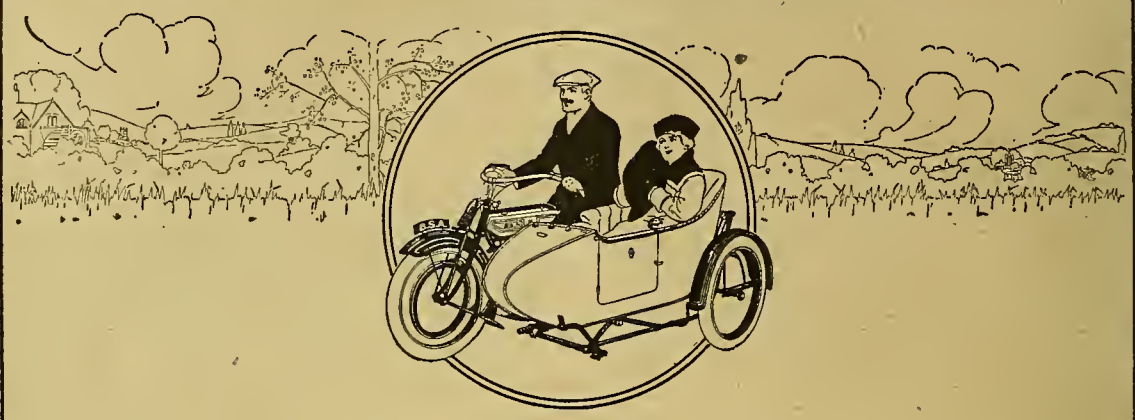
In answering this advertisement it is desirable to mention "The Motor Cycle."



War conditions have emphasised the soundness of B.S.A design & the efficiency of the B.S.A. Motor Bicycle fitted with B.S.A. Countershaft Three Speed Gear.

Latest Catalogue free from The Birmingham Small Arms Company Limited, Small Heath, Birmingham

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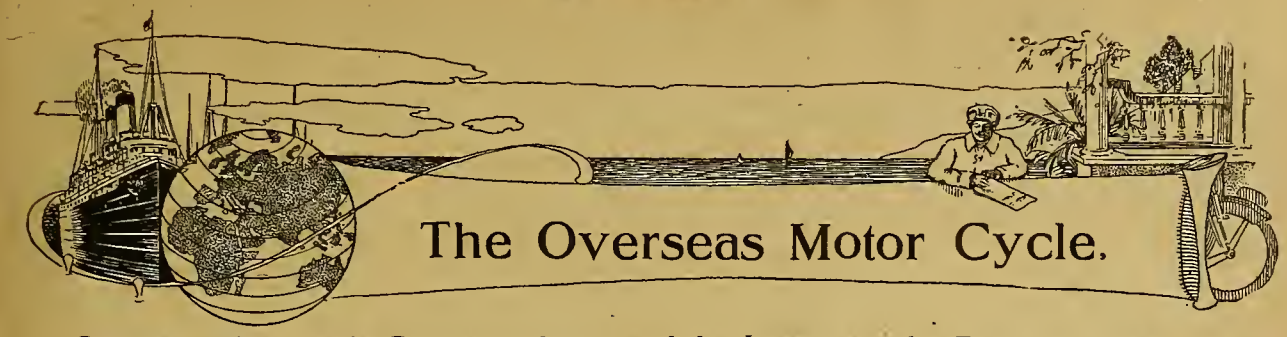
MOTOR BICYCLES
For Solo or Sidecar



The Overseas Motor Cycle.

Summary of a Year's Correspondence and the Lessons to be Derived Therefrom.

This article summarises the numerous lessons to be derived from a study of the expressed views of Overseas motor cyclists. Many British machines, though excellent at home, just fall short of Overseas requirements, and the suggestions and hints contained in a year's correspondence from practical riders should assist in the development of an ideal Overseas model or models.

"WHAT we need," writes an Australian reader, "is American standards of service in spares plus British standards in quality of goods."

When one comes to review a year's correspondence from Overseas readers this sentence strikes one as the keynote of at least ninety per cent. of the letters received, but the time being inappropriate, we do not intend in the following article to deal with the matter of sales and service. It is obvious that we shall have to be content with a very small share of Overseas trade unless, after the war, we can establish superior organisation for the benefit of the man who actually buys the machine: for while we may have the best motor cycle the world can produce, Overseas riders will content themselves with the second best if by so doing they are assured of superlative treatment and regular service of spares.

In the same pithy letter our correspondent adds:

> "What suits the Overseas rider will give perfect satisfaction at home, but what suits at home will very often prove quite unsuitable Overseas."

Nothing need be added to this concise summary of the general position of things from the point of view of the Overseas rider; he must have proper treatment and good service from the retail man; he must have a machine designed for really rough roads—strong, but not unnecessarily heavy.

Chain or Belt Drive for Universal Service?

Occasionally we receive letters stating that the chain-cum-belt drive leaves little to be desired, but the net total of the opinions received undoubtedly points to chain drive being in general favour for the universal Overseas model—the machine which is to give satisfaction in all countries and climates, and with sidecar or without.

The Overseas markets which present the brightest promise are, for the most part, tropical or semi-tropical, and the fact that belts are susceptible to climatic conditions very much limits their area of usefulness. In tropical lowlands it is found that rubber belts soon crack, owing to the temperature and dryness of the atmosphere, while leather belts are not entirely satisfactory as an alternative because of their grit-accumulating propensities, with resultant worn pulleys. In the hills the atmospheric conditions may be favourable, but here steep gradients, watersplashes, and rough roads demand a more positive form of drive. The total sum of opinions is, therefore, that the all-chain drive would give the most general satisfaction, and the question of open or enclosed chains now arises.

On the face of things, the enclosed chain drive would appear the more suitable and up-to-date, but there are several intermediate points to consider. Chain cases must be exceedingly well made and well designed if they are to warrant the extra weight and complication. If spring frames are to fulfil expectations by becoming the general order, then the difficulties of perfecting the rear chain case are much enhanced, and unsprung weight is increased. It would indeed require a well-made and well-anchored chain case to stand the racket of being attached to a wheel which followed every indentation of, say, a Rocky Mountains mining camp trail—and even with rigid-framed machines we have known so many Colonial riders who have disfigured their mounts from the outset by removing the back chain case, that we doubt whether this refinement would be generally appreciated.

The general opinion seems to be that the rear chain is as well left open (though adequately shielded) till more advanced designs have been made and tested at home. Open chains should be kept free of oil, stiff graphite being the only lubricant used. An oily chain readily accumulates grit, which forms into an ideal grinding mixture, soon wearing not only the chain but also the sprockets.

The front chain and clutch must, of course, be enclosed, and it is particularly desirable that ample ground clearance be given the front chain case. On one or two British machines, which are popular Overseas, the bottom of the front chain case is almost the lowest point, with the result that it soon becomes battered and a bad fit, probably touching the chains. The front case should be an aluminium casting, with good, wide, oiltight joints. If the frame were so designed that the engine-shaft, countershaft, and rear wheel spindle were all on the same line, better chain case clearance would be obtained, but in all present designs the countershaft lies below a line drawn from the engine-shaft to the centre of the rear wheel.

A dry plate countershaft clutch of ample diameter is probably the most suitable type, chiefly because it is not so susceptible to the ill effects of grit as the metal-to-metal type. The insets should be so arranged that they can easily be renewed when worn shallow, and every allowance should be made for full wear.

As regards clutch control, the following letter from Mr. H. C. Mansfield, Goulburn, N.S.W., is typical of many:

> "An h.b. clutch is a general advantage, as often we have to negotiate steep banks and stretches of sand, where it is impossible to ride; but with an h.b.c. clutch one can walk alongside, the clutch just sufficiently engaged to pull the machine."

There is no doubt that the h.b. clutch control offers enormous advantages, and with a duplicate foot control it would entirely fill the bill.

Engine Capacity an Open Question.

The question of engine capacity does not enter into this summary. The baby two-stroke, the small flat twin, and the 1,000 c.c. each has its place Overseas, and there is no doubt that Britain will establish an enormous market for her lighter types of solo mounts. In this line the British manufactures enjoy pre-eminence, and we shall undoubtedly see the light British colonial models holding their own against foreigners of double the power—and weight. Slightly better provision for cooling should, perhaps, be made than is necessary in England, but this matter rests as much with the producers of fuels and carburetters as it does with the manufacturers of cylinders.

Most British machines are at a great disadvantage Overseas on account of their shallow engine clearance, though this point has been rammed home so

The Overseas Motor Cycle.—

often that we need only attempt to emphasise its importance. Shallow ground clearance is the *bête noire* of the British sidecar machine abroad, and the number of letters we have received telling of damaged crank cases is surprising.

> Mr. F. Goodwill, Bangalore, writes that his 6 h.p. outfit "spoilt trade to the tune of £15 to £20 owing to its low clearance"; and
>
> "J.G.," Dolls Point, N.S.W., among numerous others, votes for a clearance of 7in., not only for the crank case, but for everything!

There is no doubt that this point alone will influence the decisions of hundreds of Overseas purchasers for just so long as British manufacturers refuse to consider their demands.

At all events the crank case should be protected by a bar of soft iron which can easily be renewed, and which is placed so that it intercepts any obstacle which would otherwise strike the crank case. This bar could conveniently carry the front footrests.

Mudguarding.

That mudguards designed on pedal cycle lines are hopelessly inadequate, we need hardly state, and wide, almost flat guards are obviously necessary. Great clearance is not necessary so long as the guards are wide and flat enough, so that mud cannot clog inside them. What the Overseas rider wants is wheel guards he can see inside and pass his hand round, and he also wants these guards to be attached to the frame in such a way that they almost form part of it. There must be no narrow lugs, filed thin at the edges, and no inaccessible nuts and screws, which jolt loose and are difficult to tighten. These wide, domed guards need to be made of very stiff metal, and arranged in such a way that, while not causing inaccessibility, they remain intact from the day the machine leaves the works till the end of its history. An annual coat of paint on the interior of the guard—the first coat being administered on the top of the works enamelling when the machine is new—will preserve the guards indefinitely.

Carburetters.

All carburetters should be fitted with an auxiliary air supply, giving a very wide range of adjustment to allow for the great differences in temperature and altitude.

> "T.C.H.," Nilgiris, India, emphasises this point, while most British Overseas possessions, which promise to become so important a market in the future, are subject to greater extremes than the British Isles.

The air intake should be of sufficient circumference to permit the use of an extremely fine filtering gauze, otherwise excessive engine wear may be caused by grit working into the cylinder and crank case *viâ* the carburetters.

> *Apropos* this Pte. A. Denby, Nowshera, India, writes that on one occasion he found the oil in his engine like gum, and thick with dust, while a gritty coating covered the flywheels and interior of the crank case.

Larger Petrol Capacity Needed.

A petrol capacity of at least sufficient for 180 miles is desirable, and the tanks of heavy machines should carry at least two and a quarter gallons. In some districts only four-gallon tins can be purchased, and one can imagine the inconvenience that would result from the possession of a tank holding less than half that quantity.

Mr. C. Vertue, Young, N.S.W., prefers ordinary turn-cock valves to screw-down needles, and our opinion entirely coincides with his. In hot weather, on steep gradients, or over rough roads, petrol is constantly oozing out at the point at which the needle passes through the tank, and much fuel can be lost in this way. To realise the extent of the loss one should fill one's tank with a heavy fuel, which does not vaporise on contact with the open air. In a few minutes one's knee-grips are saturated, and the fuel is dripping freely from the edges of the tank.

For Overseas use semi-T.T. bars might be fitted as standard, the touring handlebar being treated as the exception.

Sidecar Attachment and Design.

Sidecar breakages appear to be common, and we are as yet undecided whether the flexible type of sidecar chassis or the rigid type is the stronger. Four points of attachment are the minimum for any class of outfit in any land. Underslung chassis certainly do not appear to be popular Overseas. The sidecar mudguard needs to be specially well secured; if it were attached to the sidecar body instead of to flimsy and ague-smitten supports its chances of a long life would be very much increased.

In the Tropics coachbuilt sidecars do not appear to last, and the basket body is at present the only solution. The aluminium body may, in due course, solve the problem of looks *versus* usefulness.

Details.

Many detail improvements are necessary. Numerous correspondents write for larger tool-bags and better provision for carrying spares, etc. We in England feel the same pinch, and there is really no reason why so little room should be provided. A large flat tool-bag on the top bar of the machine, in addition to those carried aft, would be extremely handy, and the spare tube case might be sprung with the saddle.

The observation that all nuts should be secured, either with split pins or spring washer, is general, and it is interesting to note that every nut on the Clyno War Office machines is castellated and split-pinned. Something of this sort should certainly be done on Overseas models.

The Care of Bowden Wires.

Occasional correspondents complain of broken Bowden wires, but we would suggest that such breakages lie at the door of the owner rather than being due to any inefficiency in that much perfected production—the modern Bowden. Particular care should be taken that the wires cannot be pinched or called upon to operate through right-angle bends. If the controls work easily, and are provided with the necessary lubrication (preferably vaseline), they should last indefinitely.

> "J.L.W.," Sec.-Lt. 2nd A.D.B.D., B.E.F., writes: "I cannot understand why some well-known British machines still have the magnetos so close to the ground in front of the engine when there is plenty of room *behind* the engine."

There is food for thought in this reminder!

The Most Serviceable Colour.

As regards colour, E. Clarke, Churchtown, N.Z., prefers khaki, but we share the opinion of numerous other Overseas riders that black is the most useful "colour." It can be touched up from any tin of stove black or enamel without any difficulty in matching the shade, and ordinary stove black, thinned down with petrol, makes an exceedingly useful wet-weather waterproofing for plated parts. We do not entirely condemn a few plated parts on Overseas machines, as many riders (especially native gentry) like them, and those who do not like them can easily enamel them over. Correspondence from India emphasises the point that machines for that country should be of non-rustable finish, as during the monsoon one's mount is never dry for weeks.

Buckled Rims and Broken Spokes.

Buckled rims and broken spokes are almost a daily complaint, and one correspondent points out that footrests sprung with the saddle, Bat or Edmund spring frame fashion, would be a blessing. We would point out, however, that this system, though excellent at home, brings the footrests perilously near the ground with each downward motion of the rider—very much more so than an ordinary spring frame.

The position of the silencer needs to be chosen so that it does not lessen ground clearance, and the silencing should be reasonably effective, as much delay and bad feeling may be caused by an exhaust which frightens uninitiated cattle, etc., into a blind panic. An exhaust operated siren should be included, the handle-bars being kept as clear of fittings as possible. The front fork springs should be enclosed, as on the P. and M., and the rear wheel brake should be sufficiently adjustable to take up wear in the block—the simplest form of brake being the most popular.

PROHIBITION IN INDIA.

THE Indian Government is issuing a notification prohibiting the import of motor cars and motor cycles, with the object of checking the consumption of petrol and conserving the supplies for military purposes, and of liberating tonnage for more necessary commodities. Some indication of the volume of business done is shown in the import figures. During the period April, 1915, to April, 1916, Great Britain supplied motor vehicles to the value of £217,000, while imports from the United States were valued at £347,000.

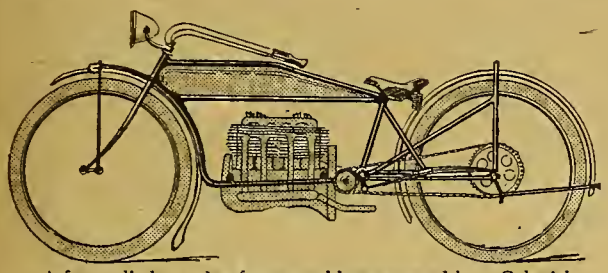
OVERSEAS OPINIONS.

A Further Selection of Letters from Readers scattered all over the World.

Spring Frame Design.

MR. E. PICARD, Hunter's Hill, Australia: "Having been a reader of your valuable paper for some years, I have followed with interest the articles on spring frame design.

"Out here in Australia spring frames are commanding great attention, and, if English manufacturers wish to do any business in the future, they must devote more attention to this problem. Another point they want to study in Colonial models is power. Why they cling to their puffing 3½ h.p. 'buses I cannot understand; 28in. wheels are an important addition also.



A four-cylinder spring frame machine suggested by a Colonial reader. (See E. Picard's letter.)

"I am enclosing a rough design of what I consider an ideal Colonial model, having a four-cylinder engine of about 8-10 h.p., a long wheelbase, laminated springs, fore and aft, of such strength that, when the rider's weight is taken, the springs sink to the same extent—not the front springs stronger, as I have seen on a certain well-known American machine.

"You will see that I have incorporated full cantilever rear springing, this giving a more supple motion than the quarter elliptic. At the centre of the spring anchorage would be a rocking shackle, also a link at the frame end beneath the seat-pillar. Twist wrist control is ideal, not being so tiresome as the lever method.

"With such fitments as mechanical lubrication, mechanically operated inlet valves, a tank of ample capacity, chain drive, and a two-speed gear, this should prove a machine well sought after by Colonials who have had to put up with stiff under-powered machines—probably suitable for smooth English road conditions only."

Carbon Deposit.

"W.G.Q." Punjab, India: "Two years ago I took up motor cycling in earnest, as an aid to my inspection of work over large areas in the Punjab. I purchased a 2¾ h.p. A.J.S., and though I am an engineer, sad to say, owing to lack of practical experience in driving, I underoiled, and I had no carbonisation troubles. In 6,000 miles I took the engine down twice, and found very little deposit. My only trouble after the above mileage was a loose small end. As my 2¾ h.p. did me so well last year, I bought a 1915 6 h.p. model with sidecar. In 3,900 miles I gave a pumpful of Mobiloil 'B' every two and a half miles and every one and a half miles in the first 100 miles. (Owing to climate more oil is required in India.) At the end of 3,900 miles I took the cylinders down as the compression was poor, though I had plenty of power. I was at once convinced of the truth of the adage about leaving well alone. The rings were highly polished all round, the gudgeon pin was almost a driving fit, there was no play anywhere, the rings were quite free, and the carbon deposit was negligible. My only trouble was pitted valves. The time taken in dismantling and reassembling was practically wasted. I ground in the valves, and compression at once returned.

"The A.J.S. 1915 engine is, of course, a very fine engine, and it may be exceptionally so, but there must be many other well-known engines which give similar results. Two-strokes may require decarbonisation after every 1,000 miles. Many owners, I believe, find 600 miles the limit, but the four-stroke engine as used on cars and motor cycles for years is streets ahead of any two-stroke ever invented as regards carbonisation troubles.

"Finally, it may interest readers to know that my A.J.S. engine after 3,900 miles had more carbon on the front cylinder and piston than on the back one. The deposit was very little; but still, those who suffer from dryness in the front cylinder might make a pilgrimage to Wolverhampton and buy a bicycle which has an engine made by Messrs. Stevens. Usual disclaimer."

Cleanable Sparking Plugs.

MR. J. M. SMITH, Bloemfontein, South Africa: "One of the most satisfactory sparking plugs I ever owned was a Peto and Radford. It had a disc on a stem for the electrode. It was easily taken to pieces to clean, and was a very fine plug, so much so that I have often wondered why that system of construction was abandoned.

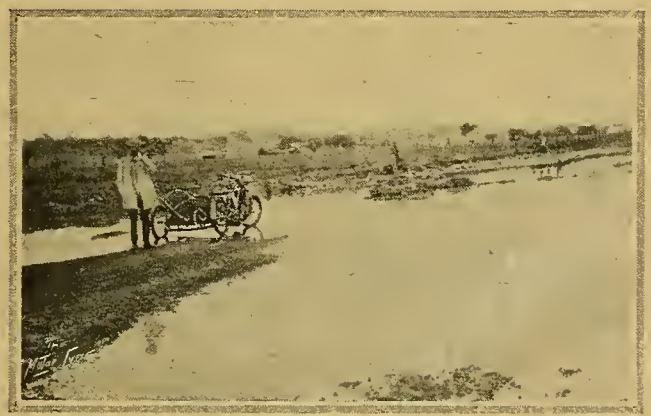
"Some time ago my machine (1913 P. and M.) would not start, in spite of many attempts. At last I borrowed a plug (I had tried two or three before that), and it went off all right, so it was the plug at fault. I washed or soaked the plugs in petrol for five hours, and cleaned them thoroughly, but with no result. I then got desperate, and, after thinking for a while, took out the central wire (Bosch plugs), lit the Primus stove, and heated the body of the plug (porcelain), etc., red hot. When they cooled I put them in, and the engine started first kick. I do not say this will do for all plugs, but I reckon it will do for most, and, anyway, it is worth trying. If it does no good it will do no harm.

"I may say I date back to the days of the good old ordinary bicycles. My first mount was an Ariel—the one with the levers and screws inside the wheels to tighten up the spokes."

A Wet Main Street.

MRS. T. E. CUNNINGHAM, Sydney, N.S.W.: "I am sending you a photograph of a Scott, taken while travelling under difficulties in an 'out back' part of New South Wales. This is a main street of a country town under water during wet weather. During this trip nothing was kept dry except one pair of pants, which, when they arrived at a town with an hotel in it, the two men had to borrow and lend, one going out for a shave while the other stayed in bed. It put me in mind of the time when one of them came rushing down the side of a mountain and ran straight into a river—motor cycle, clothes, and everything—and, after getting the machine going again, had to travel twenty miles before coming to any habitation at all.

"Mr. Cunningham is a very enthusiastic rider, and has been for a number of years, and has ridden a large variety of solo machines. But since purchasing combinations I think I have owned and ridden in as many different makes of sidecars as any lady in Australia. Most of our friends keep their machines from year to year, but it is characteristic of Mr. Cunningham to change about. The A.J.S. is no longer with us, our latest being an 8 h.p. water-cooled Williamson. But I will never forget the A.J.S.: it was splendid."



A Scott sidecar encounters floods in a "main street" of a country town "out back" in N.S.W. (See Mrs. T. E. Cunningham's letter.)

TIMES TO LIGHT LAMPS.

GREENWICH TIME.

Jan.	4	... ...	4.32 p.m.
,,	6	... ...	4.35 ,,
,,	8	... ...	4.38 ,,
,,	10	... ...	4.41 ,,

Daylight Saving Again.

April 1st is suggested as the date for Daylight Saving to commence this year—much earlier than last year.

War Models.

Several manufacturers are expecting to share in a large order for powerful motor cycles, with and without sidecar attachments, required for the Russian Government.

Another Stolen Motor Cycle.

£10 reward is offered by Sec.-Lt. Cecil C. Clark, R.F.A. and R.F.C., for the recovery of his 1915 3½ h.p. all-black T.T. Sunbeam fitted with a B.S.A. carburetter, Bosch magneto, and Lucas lamps, which was stolen from an aerodrome in Yorkshire.

American Impressions of the Scott Sociable.

America appears to have been favourably impressed by the Scott Sociable. The coloured cover picture of a recent issue of the *Scientific American* shows two Scott Sociables amidst artistic rural surroundings. The picture is headed "A Motor Car for the Multitude—A Recent Development of the Motor Cycle."

Motor Cycle Police in Australia.

Motor cycles are now being adopted by the Traffic Police Department of Australia. The mounted constables wear a uniform of neat-fitting khaki with tan leggings and boots (says *The Motor in Australia*), and the new units are distributed about the various suburbs, including Randwick, Kogarab, and Chatswood.

Let us hope that the British police will follow the example of the more progressive Colonial.

Increased Railway Rates and the Motor Cycle.

Now that railway services are reduced and passenger rates increased to 1½d. a mile, there should be no doubt, even in the minds of the most sceptical, that the motor cycle offers not only the most convenient, but also the cheapest, mode of travel. These new conditions should have a distinctly enlivening effect upon the second-hand market, and, new machines being unobtainable, owners with good second-hand mounts for sale will find an excellent market this spring.

Excessive Zeal at Stratford Court.

Recently a photographer of our staff was convicted at the Stratford Court House in London for exceeding the speed limit with a motor cycle and sidecar, the Bench imposing a fine of £5. The defendant asked whether he might go to his home and procure the balance, but apparently the magistrate made no reply, and the police in court promptly put the unfortunate motor cyclist into a cell, where he was kept for an hour and five minutes. During that time the police telephoned to our Tudor Street offices, and a member of the staff at once went to Stratford Court with the money.

In view of the fact that the original summons had been served on the defendant at his home address, which was, therefore, verified by the police, and further that he offered to leave either his motor cycle and sidecar (which stood outside the court) or his gold watch in charge of the police till he obtained the money, we need hardly ask whether, in the opinion of our readers, the steps taken were rather too drastic.

An Expression of Regret.

We are informed by the Commissioner of Police that, as the magistrate did not allow the defendant time to pay the fine, the police action in the matter was quite in order, as the gaoler was acting not as a police officer, but as a servant of the court under the magistrate's directions. An expression of regret for the inconvenience and delay caused is subsequently included in the Commissioner's letter.

SPECIAL FEATURES:

VOLUNTEER MOTOR CYCLISTS' SPEED TRIAL.

OVERSEAS NEWS AND VIEWS.

ROAD TEST OF A SCOTT SOCIABLE.

New American Sidecar Record.

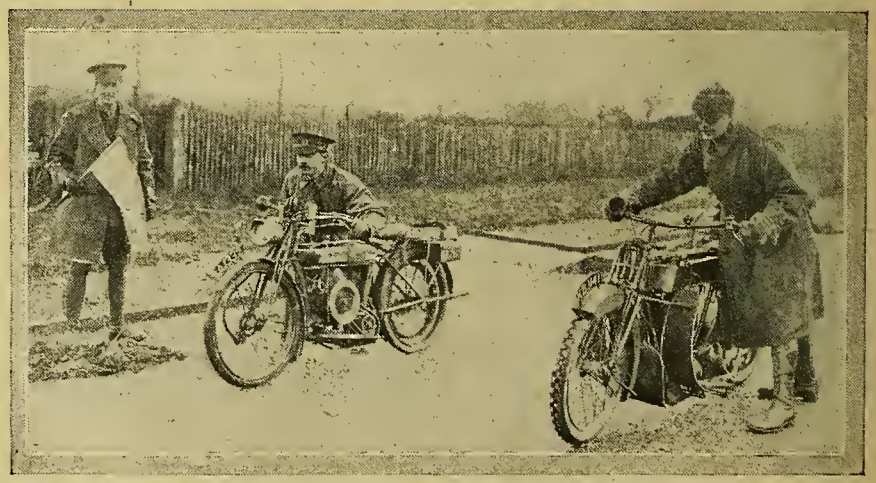
A new twenty-four hours sidecar record has been established in the United States. Two Indian riders covered the 584 miles between Springfield and Montreal, which necessitates crossing the Adirondacks, in 19h. 27m.

A Prospering New South Wales Club.

The Lithgow Motor Cycle Club appears to be making rapid headway, and many new makes of machines have recently made their *début*. Mr. "Bob" McGarry appears to be a very active member, and it is quite refreshing to read about the fine weather, hill-climbs, and reliability trials which the energetic members of this club are organising.

Home Devised Lighting Set.

One of our readers has fitted up an old low-tension magneto, originally belonging to a F.I.A.T. car, as a lighting set for his sidecar outfit. The arrangement has worked excellently for some months, and though the lights flutter a good deal no lamp troubles have been experienced. The lamps are connected direct to the magneto, no batteries being used.



NORTH-WESTERN VOLUNTEER MOTOR CYCLISTS' SPEED TEST (see page 15).
F. Thackery starting F. A. P. Zacharius (7 h.p. Sunbeam) and F. W. Mainey (2¾ h.p. Douglas). The former won, but owing to the state of the road could not "let out" his Sunbeam to its limit.

The National War Funds.

At the week-end the principal war funds stood as follow :

British Red Cross Fund	£5,755,692	0	0
Tobacco Fund	123,073	0	0

Curious Damage.

A reader in the R.F.C. sends us a photograph of his machine after trying conclusions at speed with a 45 h.p. car. The impact knocked the cylinder clean off the machine, leaving the cylinder base plate securely bolted to the crank case. The rider luckily escaped unhurt.

A Kindly Act.

On Saturday last Mrs. C. A. Vandervell entertained 400 wounded from the Roehampton Hospital in the canteen belonging to Messrs. C. A. Vandervell and Co. The men arrived at twelve o'clock, and after an excellent dinner they were entertained to a first-class concert.

Safety First.

The Commercial Motor Users' Association have made the following recommendations in view of the Safety First campaign. A driver intending to stop or slow down should hold up his right hand. Previous to turning to the right he should hold out the right hand horizontally. Previous to turning to the left he should hold the right hand up or extend the left arm in such a position that it can be seen. In crowded traffic vehicles should be kept under close control. In turning corners to the right a wide sweep should be taken. When turning to the left the driver should turn close to the kerb. A Safety First kinematograph film, prepared by the London General Omnibus Co., is being shown at each performance at the London Coliseum.

A Special Case for a Special Constable.

Verily the duties of a motor cyclist special constable are many and varied. A recent duty of W. H. Carson, the Excelsior manufacturer, who is a sergeant in the Coventry Special Constabulary, is, however, probably without parallel. Last week a telephone message was received at the police office that a man who had imbibed too freely was creating a disturbance. Mr. Carson at once transported a constable to the scene. The man proving unruly, he was put into the sidecar, and the fourteen stone constable sat on him, and thuswise the police station was reached in record time for such cases.

The German Petroi Haul (?) in Rumania.

Mr. Watson Rutherford, M.P., presiding one day last week at the annual meeting of the Rumanian Consolidated Oilfields, Ltd., said that he had just heard that the British Military Mission had carried out at the last moment everything possible to ensure the utter destruction of the company's wells. Everything had been rendered useless either to the enemy or anyone else. The petrol captured by the enemy was less in value than he would have been able to obtain by buying from Rumania during any corresponding three months since the war began. The German papers are furious at the efficient manner in which the oil wells in Rumania have been destroyed. An officer on the German General Staff says, "Whatever could be ruined has been ruined," and, needless to say, we are very glad to hear it.

Tendencies of Design in U.S.A.

An article in Wednesday's issue of *The Light Car* on light car design at the New York Show demonstrates the fact that, like American designs of motor cycle, the American light car is gradually assuming a European conformation, particularly with regard to outward appearance. Thus history repeats itself. The early American pedal cycles were a law unto themselves, but gradually and surely they embraced many British features, until to-day there is practically little difference between the two countries.

Unpleasantly Seasonable Roads.

The roads in many districts over the Christmas holidays, especially in the Midlands and North, were in an almost unrideable condition, owing to thick ice caused by the half-melted snow which had refrozen. While frozen hard this type of surface was bad enough, but when on Thursday it became covered with water it was practically an impossibility for a solo machine to stand up on it. Many motorists state that never before have they experienced such treacherous surfaces. One rider of over ten years' standing took three and a half hours to cover a distance of eight miles on a solo motor cycle. In this distance at least twenty spills resulted, and at the completion he was forced, for the first time in his motoring experience, to give up owing to road conditions and complete the journey by train.

A Budding Juvenile Designer.

Our illustration is abstracted from a Bristol newspaper. It formed an amusing result in a Christmas drawing competition for children. We do not wish to belittle the efforts of any youthful artist, but he has succeeded in portraying a D.R. mounted on the most astonishing type of Douglas machine we have ever seen. Douglas riders will

laugh at the many mechanical inaccuracies—a flywheel below the engine, a cased-up back cylinder, novel spring forks, an invisible drive, and a real study in frame design.

Nevertheless the attempt is not bad for, we presume, a lad of about 12 years, and we urge him to persevere in his artistic efforts.

An Unusual Trouble.

A reader relates an experience which has its moral. Whilst in Devon recently one of the cylinders of his machine blew in halves four fins from the bottom. The engine, it so happens, was not of British make, and on telephoning the agency our correspondent was informed that no front cylinders were in stock. The trouble was later diagnosed by the agent's expert as resulting from a tiny crack caused by a seizure. The owner is confident that no trouble of the kind occurred during his ownership of the machine, and the agency retorted that the seizure must have occurred during its road testing, and in any case that it might have been so slight that it could be taken for a misfire or a partial petrol stoppage.

Some Contents of this Issue.

We commence this new volume of *The Motor Cycle* with several exclusive features of general interest. Firstly, Overseas motor cyclists will find much to attract them. The Scott Sociable, which created such a furore at the time we described and illustrated it in these columns, has now been put through its paces in Yorkshire by a member of the staff, and his impressions are published, whilst two other exclusively illustrated features include an account of a Volunteers speed trial in the North-western district, and particulars of a new 4 h.p. twin Excelsior for one of the Allied Governments.

There are many other items of news in this comprehensive issue.

A Weird Experience.

Major T. W. Loughborough, the secretary of the Auto Cycle Union, while on duty with the Surrey Volunteers the other evening, was driving his 7 h.p. Matchless and sidecar at a very slow speed, when he gently bumped into a pillar-box at a point where three roads joined. He dismounted to examine one of the roads and see if it were the one he wanted to take, and then, as he thought, crossed over to where his machine was, only to find that he had lost it completely. After groping about for twenty minutes, he had to call in the aid of a passing cyclist before he was able to discover it. This is one of the weirdest fog experiences of which we have heard.

Bearing Pressures.

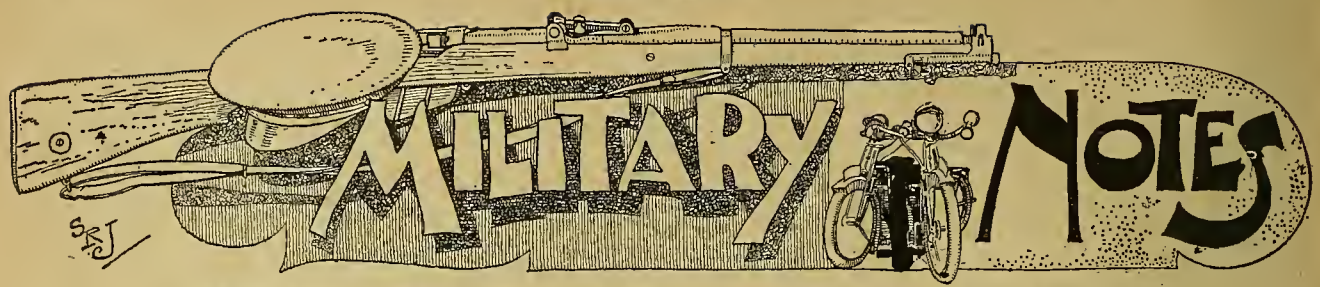
With reference to the article which appeared on the above subject in our issue of October 19th Mr. Norton sends us the following letter received from a German in an internment camp in the Isle of Man :

"May I be allowed to mention that the value of the 27 lb. given in the second formula is not quite correct, as it should be 30.261 lb.? Being a designer of high-speed petrol engines myself, and one who takes a special interest in the long-stroke type, I trust that you will pardon me for trying to uphold the name of your famous engine. Of course, there is no doubt that other people besides yourself have found the error out, but I simply took the matter up for the reason mentioned above. The formula given for the pressure or force required is $P = \frac{wv^2}{gr}$. The value of v^2 in the case of the 96 mm. stroke engine is equal to

$$\left(\frac{96 \times 3.14159 \times 1500}{60 \times 25.4 \times 12}\right)^2 = 611.93.$$

$$\text{Then } P = \frac{0.25 \times 611.93}{32.2 \times .157} = 30.261 \text{ lb.}$$

"If I had the necessary writing space at my disposal I would write something more on main and gudgeon pin bearing pressures.—PAUL A. HIPPERMANN."



A FEATURE COMMENCED IN "THE MOTOR CYCLE" OF MARCH 21st, 1910.

THANKS!

WE have to acknowledge, with many thanks, the receipt of a number of Christmas cards and New Year greetings from all over the world. Particularly gratifying to us is the selection of cards from readers in the Services; some of them were exceedingly well-timed (incidentally, a motor cyclist was always known for good timing!). A day or two before Christmas, cards arrived from Afghanistan, Macedonia, Egypt, Poona (India) (Sergt. A. J. Sproston, R.E., sends his best wishes to all the "boys" at home, adding a grateful thought for the fallen), whilst from Austria there was a card from Basil Vickers-Jones, who has been interned in Lower Austria since the commencement of the war. Vickers-Jones held an important position at the Bavarian works of the Premier Co. before war was declared, and was interned with other British residents. He wrote us six months ago asking for motor papers to interest the members of a motor class of British prisoners. We were only too happy to fall in with the suggestion; but, sad to relate, the parcel was refused, and the letter returned marked, "Interned in enemy country. Cannot be delivered."

It has pleased us very much to receive a number of cards from readers on the French front, some of them from men who were recruited by the Editor of *The Motor Cycle*. Among the men in the Services who send us greetings are such well-known names as Lt. T. E. B. Chalmers, A.S.C.; Lt. T. Woodman, R.F.C.; Cpl. W. Pratt, M.G.C., H.S.; Sgt. Cyril Williams, R.E.; Cpl. T. E. Greene, A.S.C.; — F. C. Dee, R.G.A.; Pte. J. F. Spencer, A.S.C.; Sgt. Howard R. Lane, A.S.C.; Flight-Sgt. J. G. Nixon, R.F.C.; Pte. Maurice Greenwood, A.S.C.; and the regimental card of despatch riders of the XIII. Corps, bearing the names of twenty-three motor cyclists with whom "*The Motor Cycle* is a great favourite, and there is always a big rush for each copy," to quote Cpl. J. B. Morris.

WITH THE M.M.G.S. IN INDIA

SERGT. A. FIELDER, M.M.G.S., India, sends the following greeting: "Just a card to wish you and the 'Blue 'Un' a prosperous New Year. I can assure you that *The Motor Cycle* is an old friend of the battery, as practically all of us were constant readers before the war." Sergt. Fielder will be remembered as an old New Hudson trials rider.

Sgt. A. Fielder.

PHOTOGRAPHS FROM NEAR AND FAR.

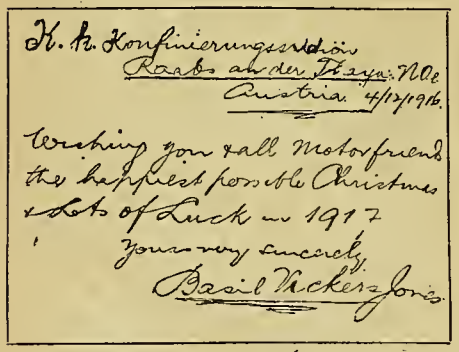
ONE of the most pleasing features in the publication of the many exclusive photographs from the war zones which are reproduced in *The Motor Cycle* is the recognition by relatives of their dear ones. A letter this week is from the wife of a despatch rider seen in one of our pictures who is now in Egypt, having been to Mesopotamia and India. The lady in question, in writing for a copy of the photograph, mentions that before parting she had strict instructions to send *The Motor Cycle* to her husband every week.

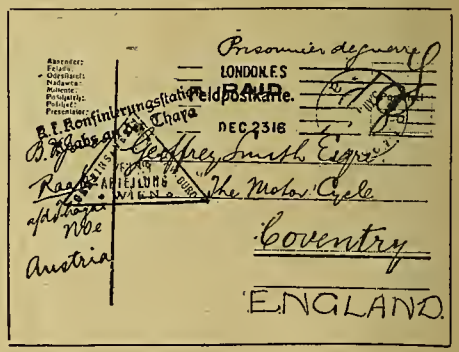
PRICES IN THE WAR ZONE.

THOSE motor cyclists who report paying sums up to 2s. for copies of *The Motor Cycle* in the different war zones may be interested to know that Cpl. P. L. Cearns, R.E., writing from France, says that *The Motor Cycle* is eagerly read by the motor cyclists of his section; none of whom has ever paid more than 3d. for a copy.

NEWS OF A PIONEER MOTOR CYCLIST.

WE recently received a letter from that old-time rider of a Vindec, Tom Woodman, who is now a Lieutenant and Officer in Charge Transport, Kite Balloon Co., R.F.C. He says, "No doubt you will be surprised to hear from me taking part in this very interesting man shoot. I am mixed up in the Air Service, and have plenty to do with all sorts of motor-propelled machines. At the moment I am in hospital with injury to the ribs, but hope to be out in the course of a day or two; inactivity is not my *forte*. We never thought twelve years or more since that motor engines would do what they are doing to-day. Anyhow, the mysteries keep unfolding themselves."





FROM AN OLD-TIME COMPETITION RIDER, NOW PRISONER OF WAR IN AUSTRIA.

From all parts of the globe we have received Christmas and New Year's greetings, not the least gratifying being a number from appreciative readers in the trenches. Among the most interesting is a greeting card from Basil Vickers-Jones, who is interned in Austria. He will be remembered as a competitor in T.T. races, his mount being a 90° twin Premier.

A SCOTTISH TRIALS RIDER.

MANY of our readers will recall A. U. Russel Downie, of Edinburgh, who figured frequently in northern competitions, including the Scottish Six Days Trials. His mount was usually an A.J.S. machine, upon which he set up several notable performances. Downie is now in the Royal Naval Air Service, which he joined at the beginning of 1916. His photograph accompanies this note.

A. U. Russel Downie, Royal Naval Air Service. He will be remembered as a prominent rider in Scottish Six Days Trials.

HIGH PRAISE FOR THE TANKS

MUCH has already been written regarding the utility of the "Tanks" for field use, but in the despatch reviewing the Battle of the Somme, General (now Field Marshal) Sir Douglas Haig says:

"The part played by the new armoured cars—known as 'Tanks'—in some of the later fights has been brought to notice by me already in my daily reports. These cars proved of great value on various occasions, and the personnel in charge of them performed many deeds of remarkable valour."

A MIDLAND OFFICER.

W. H. H. SHELDON, the Regal rider, of Birmingham, is now a second-lieutenant in the A.S.C., M.T. Previous to joining this section Lt. Sheldon served two years in the Royal Engineers as a despatch rider, and he was moved to write to us by the publication in the issue of December 14th of the photograph of Ernest Smith, a former partner of his, and the one and only Jack Woodhouse (now a Flight Commander), in the Regal business. Sheldon rode a Green machine in the last Junior T.T., and has also figured with success in a number of Midland motor cycle competitions.

MOTOR CYCLISTS' KEENNESS.

THE accompanying photograph is of a motor cyclist quartette attached to one of the Divisional Field Ambulances. The picture was kindly sent to us by E. G. Mackenzie, who writes as follows:

"Doubtless the picture will interest you. Obviously the machines are good old Triumphs, three being 1915's, and my own mount a 1916. Reading from left to right the riders are: G. Caley, D.C.M., Hopkins, Mackenzie, and Murphy, known as 'Spud.' I have been riding out here since September, 1914, and all my pals run me pretty close. All our machines have been over newly captured ground. We are all quite keen on our jobs, and would under no circumstances change with anyone out here."

A MIDLAND CLUB SECRETARY.

AMONG the Christmas greetings we received was one from Howard R. Lane, now a sergeant in the A.S.C., M.T., who for a considerable period was secretary of the Sutton Coldfield Automobile Club. Sgt. Lane is still in France, and is attached to an A.S.C., M.T., lorry park, where he has been for many months. He, like many other motor cyclists, is eagerly looking forward to the return of competition days.

Sgt. H. R. Lane.

PROMOTIONS.

IN last Monday's *Gazette* we noticed that Flight-Lt. L. P. Openshaw, R.N., has been made a Flight-Commander; also that Flight-Sub-Lt. W. G. McMinnies, R.N.A.S., has been promoted to the rank of Flight-Lieutenant. Temp.-Capt. S. W. Carty, A.S.C., and Lt. Leslie Gamage have been awarded the Military Cross.

Motor cyclists attached to the Divisional Field Ambulances astride Triumphs. Reading from the left the riders are: G. Caley, D.C.M., — Hopkins, E. G. Mackenzie, and — Murphy.

Racing at Gatooma, South Rhodesia.

British Motor Cycles occupy a Prominent Place in the Results.

A MOTOR cycle race meeting was held at Gatooma, S. Rhodesia, on the 12th November last, the races being run on the Gatooma-Golden Valley Mine Road, which provides a stretch of 11½ miles of fairly good going.

The first race to be run was the District Championship for all machines, and the following riders lined up: Reynolds (4¼ B.S.A.), Ross (4¼ B.S.A.), Dawson (6 Enfield), Reacord (5 Indian), Juul (5 Indian), and Lang (7-9 Powerplus Indian). Lang fell in cornering at speed, and the following results were obtained:

	Av. speed.
1. Dawson (6 Enfield) ...	48.5 m.p.h.
2. Reacord (5 Indian) ...	46.5 ,,
3. Ross (4¼ B.S.A.) ...	36.4 ,,

The second race was a One Mile Handicap on horse-power, and was run over a different section of the road, the following machines being entered: Reynolds (4¼ B.S.A.), Ross (4¼ B.S.A.), Dawson (7-9 Harley-Davidson), Juul (7-9 Powerplus Indian), Reacord (5 Indian), and Dawson (6 Enfield). Juul (7-9 Indian) came in first, while Reynolds (4¼ B.S.A.) obtained second place.

The 11.7 Mile Handicap (on h.p.) drew seven entries, but unfortunately Lang (7-9 Powerplus Indian), who was scratch, again came off at one of the corners and cut his arm badly. Winners:

1. Reacord (5 Indian) ... 12m. 50s.
2. Dawson (6 Enfield) ... 12m. 10s.

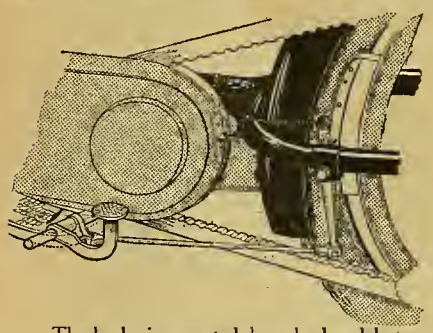
Dawson's speed averaged 57.6 m.p.h., which was a good performance, as the track was far from perfect.

In the afternoon a potato race, with ladies occupying the sidecars, and musical chairs, caused great amusement, and the meeting was voted a thorough success.

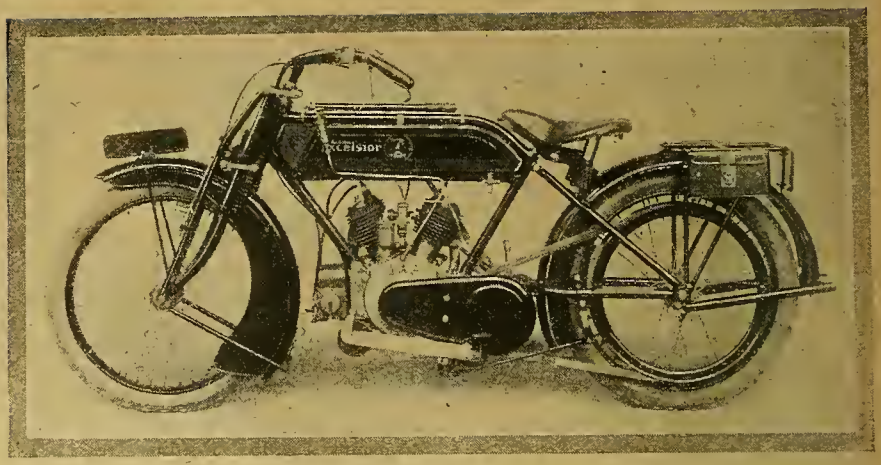
A NEW TWIN EXCELSIOR.

A Twin-cylinder Machine Designed for Overseas Purposes and Used by the Allied Armies.

MESSRS. BAYLISS, THOMAS, AND CO., manufacturers of British Excelsior motor cycles, have recently introduced a new twin-cylinder model, which will probably supplant the big single which has done duty under this old and respected name as a very taking double purpose mount. This new model is designed to meet military Overseas requirements, and possesses several excellent features, though in general design it follows standard practice. Very special attention has been paid to the mudguarding, and, the machine being built for use in a rough country, a ground clearance of 6in. is provided. The specification includes the well-tried Sturmey-Archer countershaft three-speed gear, adjustment for which is provided, 2⅜in. Dunlop tyres, B. and B. or Amac carburetter, and Druid new pattern forks. The wheelbase is 56in., and the height of the saddle 30in.



The brake is operated by a heel pedal at the rear of the left footboard.



The new 4 h.p. twin Excelsior, fitted with three-speed Sturmey-Archer countershaft gear, and chain-cum-belt transmission.

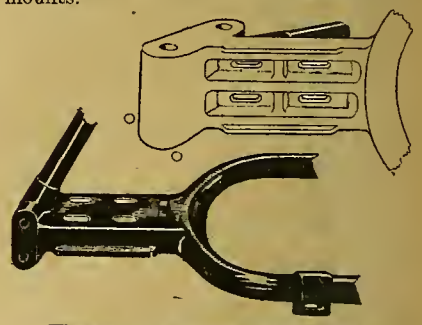
Chain-cum-belt Transmission.

The 4 h.p. J.A.P. engine, of a bore and stroke of 70 × 64.5 mm. (496 c.c.), has been selected. This engine is of the same dimensions as the 3½ h.p. model, but is provided with larger flywheels, which renders it better suited to sidecar use. Chain-cum-belt transmission is employed, the countershaft pulley being of sensible diameter, and the chain, of course,—enclosed. The rear wheel brake is a thoroughly well-designed mechanism, and possesses any amount of retarding effect. It is operated by a heel brake on the left footboard.

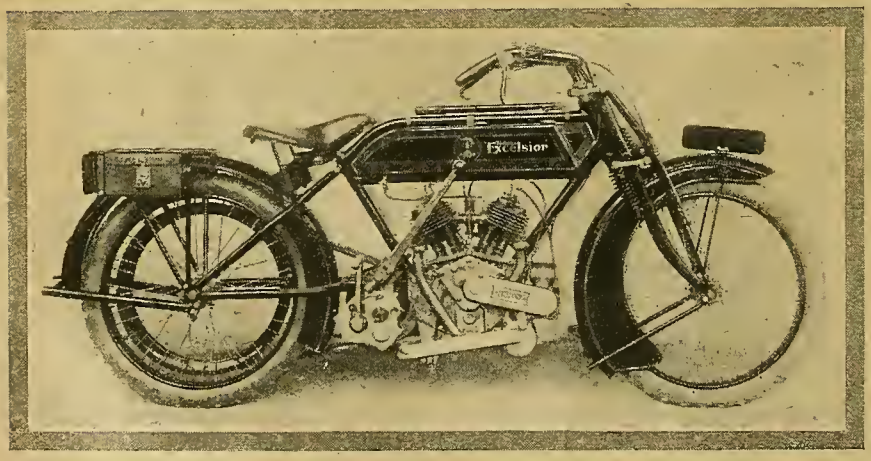
The machine generally conveys an impression of solidity. The clutch, it will be observed, is controlled from the handle-bars, and the change speed lever is well situated and of sensible size.

There seems to be some doubt as to the possibility of immediate delivery of this model for private use, but we understand that other Excelsior models on somewhat similar lines are at present under course of construction. The model illustrated is by this time in the hands of the French Government.

The adoption of a medium powered twin by the Excelsior firm is a sign of the times, as this company has hitherto paid special attention to single-cylinder mounts.



The gear box bracket, showing slots provided for adjustment.



The capacity of the engine is 496 c.c. (70 × 64½ mm.). Although the capacity of the engine is the same as the 3½ h.p. J.A.P., the flywheels and crank case are larger, a feature conducive to smoother running.

A DUTCH CLUB TRIAL.

WHILE we in England have now no thought of holding trials or races, our neutral friends the Dutch continue to hold competitions of various kinds. One of the latest was a reliability trial consisting of a run over the Dykes. The weather conditions were most unpropitious, and the roads were in an appalling condition, which probably accounted for the small number of starters, viz., fifteen. Starting and finishing at Amsterdam, the course measured forty-one and a quarter miles.

The idea of the run was for the competitors to adhere to schedule time, while the particularly tricky route had to be followed by means of special maps. All experienced great trouble in ploughing through the mud, and most had falls. The first to finish came in at 12 noon (the start was at 9.30 a.m.), but none succeeded in adhering to the schedule.

The winner of the highest award, viz., the gilded silver medal, was P. J. Kestuen, on a 7 h.p. Indian. Of the three British machines entered, the James two-stroke, ridden by W. H. Wellensech, was the only one to start, and obtained a silver medal.

The following also gained awards:

S. Birnbaum (American Excelsior), bronze medal.
M. C. v. d. Wal (American Excelsior), silver medal.
F. J. Visscher (7 Indian), silver medal.
C. F. G. Eijkelen (7 Harley-Davidson), bronze medal.

A Volunteers' Speed Trial.

R. B. Stevenson (3½ h.p. Rover sidecar) winning a heat at the meeting of National Motor Volunteers on the new road near Birkenhead.

MOTOR cyclists of Liverpool and district have long felt the want of a "fast stretch" on which they could let out their machines to their heart's content. Thanks to the enterprise of Mr. S. W. Phillpott, a meeting was arranged to take place on part of the new road from Eastham to Ellesmere Port (about eight miles from Birkenhead) —an ideal course of approximately three miles in length.

Mr. S. A. Kelly, road surveyor, a member of the N.M.V.'s, obtained permission to use the road, which at present is not open to the public.

Invitations to take part in the trial were sent to the members of the N.M.V.'s of Liverpool, Southport, and district, the events to be of a purely sporting nature, no entry fees being asked and no prizes given. It was decided to arrange the events on the "knock out" principle—that is, to run the competitors in pairs from the same starting point, ignoring engine capacity, the winners of the heats to meet until all but the winner were eliminated.

RESULTS OF FINALS.

CLASS 1.—C. P. Ellis (2¼ Triumph), walk over.

CLASS 2.—F. W. Mainey (2¾ Douglas) beat H. T. Williams on similar machine. Time, 1 min. 9⅘ secs., about 39 m.p.h. This was the fastest time of the day, being run when the track was in the best condition. Later in the day, when the track became loose and muddy, the riders of the big twin machines did not fancy letting their engines out.

CLASS 3.—F. W. Mainey (2¾ Douglas) beat R. B. Stevenson (3½ Rover). Time, 1 min 13⅗ secs., about 37 m.p.h.

CLASS 4.—F. W. Mainey (2¾ Douglas), beat E. Thomas (3½ Scott). Time, 1 min. 15 secs., about 36 m.p.h.

CLASS 5.—F. A. P. Zacharius (7 Sunbeam) beat F. W. Mainey (2¾ Douglas). Time, 1 min. 11⅘ secs., about 37½ m.p.h. Mr. Zacharius obtained delivery of the Sunbeam only on Christmas morning, and was not accustomed to so heavy a mount.

CLASS 6.—SIDECAR EVENTS UP TO 3½ H.P. R. B. Stevenson (3½ Rover) beat T. Webster (3½ Sunbeam). Time, 1 min. 55 secs., about 23¾ m.p.h.

CLASS 7.—E. Thomas (3½ Scott) beat W. E. Moore (6 Rex). Time, 1 min. 49 secs., about 24¾ m.p.h.

CLASS 8.—ANY POWER. J. Wood (7-9 Harley-Davidson) beat T. Parker on similar machine. Time, 1 min. 24⅘ secs., about 32 m.p.h.

A series of matches was then run off, and provided the most excitement during the afternoon.

Results of Matches.

SOLO EVENTS.

R. B. Stevenson (7 Sunbeam) beat E. Thomas (Scott).

E. Thomas (Scott) beat H. T. Williams (Douglas) by six inches. This was a splendid race: the Scott got away well, and led at the bottom of the dip by 20 yards, then the Douglas came up with a run, only just failing to overhaul the Scott. Time, 1 min. 20 secs., about 34 m.p.h.

R. B. Stevenson (Rover) beat Williams (Douglas). Time, 1 min. 15 secs., 36 m.p.h.

E. Thomas (Scott) beat Zacharius (3 Enfield). Time, 1 min. 20 secs., 33 m.p.h.

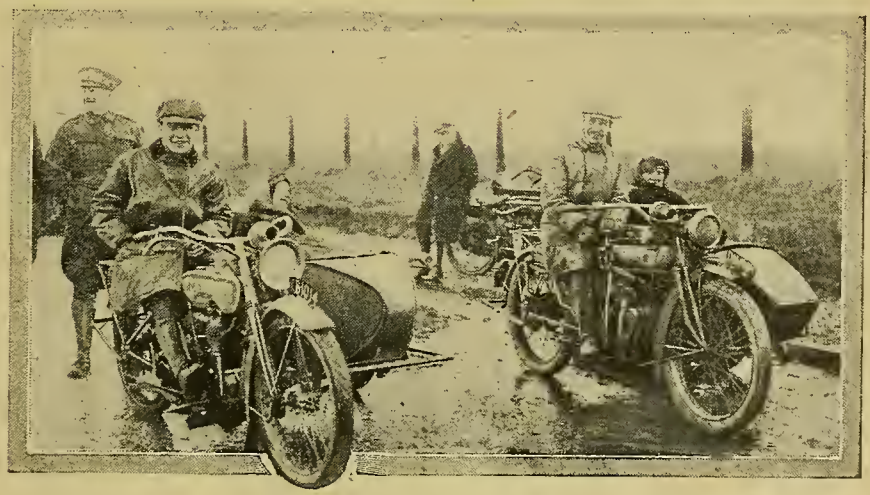
SIDECAR EVENTS.

J. Wood (7-9 Harley-Davidson) and lady passenger beat C. H. Dalmar (7-9 Indian), also lady passenger, by 5 yards. This was a splendidly contested race, as the Indian was travelling the faster at the finish. Time, 1 min. 14⅘ secs., about 31 m.p.h.; fastest sidecar time.

Mr. Parker (Harley-Davidson) beat Mr. Dalmar (Indian).

At about 1 p.m., after the single events had been run off, a move was made to the Ferry Hotel, Eastham, where about fifty members partook of a good lunch, which was paid for out of the section funds. The track being reached again, racing was resumed with sidecar classes, the proceedings terminating at about 4 p.m.

The outstanding features were the speed of Mainey's Douglas and the consistent times of Mr. E. Thomas's Scott.



The most sensational race of the day in the heavy classes was the heat between J. Wood (on a 7 h.p. Harley-Davidson), who won by five yards, and C. H. Dalmar (Powerplus Indian).

CAPE PENINSULA CLUB.

IN spite of the fact that fifty-seven of its members are on active service, the Cape Peninsula Motor Cycle Club seems to have enjoyed a successful season. With a remaining total of two hundred and five members the Social Committee has confined its efforts to organising motor outings for sick and wounded soldiers, and over 1,800 men have been able to enjoy these outings during the year.

LETTERS TO THE EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

A CURIOUS CASE.

Sir,—With my two-stroke New Hudson I have experienced a similar trouble to that of Mr. H. J. Ives *(The Motor Cycle,* December 21st), especially after being out in the rain. I have found running all oil out of the engine and putting in fresh oil very effective. I believe the cause of the trouble is rain being drawn into the cylinder through the air intake.

Weymouth. NOVICE.

Sir,—I believe the trouble Mr. H. J. Ives (2581) has met with in his 2¼ h.p. Levis is entirely due to the release valve, the spring of which obviously requires to be changed for a new and stronger one. It would also be well thoroughly to clean the release valve, valve seat, valve stem, and valve stem guide, and rub them with blacklead before replacing. It would also be well to see that the valve stem itself is true and straight, as it might be slightly bent.

If Mr. Ives carries out the above suggestions I feel confident all will be well again.

MONTAGUE C. WILKINS.

LADY MOTOR CYCLISTS.

Sir,—I have been the happy owner of a Levis lightweight for six months. I have always been interested in motor cycling, and for years before I ever hoped to possess one myself was a keen reader of *The Motor Cycle.* When the war began to make a nurse's work at home twice as heavy I started seriously to contemplate ways and means to obtain something quicker and less tiring than my old friend the push bicycle. Increased work having considerably helped savings, I heard one day of a small Levis for sale which came well within my means, so I went up to see it, and rode home—the first time I had ever been on a motor cycle alone—a distance of about four miles, rather hilly, too, without the least difficulty. Of course, thanks to *The Motor Cycle,* I had a pretty good idea of the workings, and the only small troubles I have had have been through neglecting rules which are laid down by experts, and which the amateur always thinks she can ignore until she finds out differently! Now I take out my Levis about 9.30 a.m., two pushes of my foot and it starts away, and does in a morning what usually took me the whole day. NURSE MARGARET CLARK.

A MOTORIST'S WAR BOOK.

Sir,—I notice in your issue of December 14th you publish a splendid testimony to D.R.'s taken from Mr. Fred Coleman's book, "With Cavalry in 1915." The testimony is no doubt deserving, but I wish to quote one part of the testimony which is liable to convey a wrong impression: "These cyclists generally used a road long after it had been given up as impassable by everyone else, and when they at last abandoned it as too dangerous for use, it was indeed time, in their parlance, to 'give it a miss.'" I notice the village of Potijze is mentioned as an objective of "Macfarline's intrepid motor cyclists."

In defence of a body of men seldom in the limelight, I ask Mr. Coleman, or anyone else who makes such sweeping statements: "How did the motor ambulance drivers continually reach the village and advanced dressing stations, three or four kilometres beyond the village of Potijze, on this same shrapnel-swept road?" In the biggest attack of the period with which Mr. Coleman deals, neither this particular road mentioned nor any other road from Ypres to the trenches was impassable to the boys with the ambulances; neither were they considered impassable to the boys taking up the ammunition and supplies, ample evidence of this being given while the attack lasted by the ever-increasing number of carcases of mules and horses scattered along these same roads, surrounded by wreckage and *débris* of all descriptions, both motor and horse vehicles being represented.

B.E.F., France. FAIR PLAY.

SINGLE V. TWIN-CYLINDER ENGINES.

Sir,—Never yet have I read anything quite so amusing as the letter from Mr. Michelmore Hitchcock in the issue for December 14th. May I congratulate you on securing it? One passage especially tickles me: "The flat twin, for which there is such a craze just now, is, in my mind" *(sic),* "out of the running as a practical mount wherever economy is of account." Experience has proved that the cylinders of the flat twin wear oval very little, if any, sooner than that of the vertical single. Apparently Mr. Hitchcock does not mind how many tyres and chains (or belts) he wears out so long as his cylinders retain their circular shape for an extra month or so in two or three years.

Might I venture flatly to contradict one statement? He says, "Every rider who has tried the two types knows that there is no sensation of power when riding a twin as compared with a single." This, of course, is absolutely untrue. I have in my time owned and ridden most English makes of both types, besides one or two foreigners (and I have no sort of connection with any of them), so I think I may claim to have had some experience. I can assure Mr. Hitchcock that there is no lack of sensation of power when I touch the throttle of my present twin.

I cannot quite make up my mind as to whether Mr. Hitchcock was being *intentionally* funny or not. While congratulating you on this "article in lighter style," which surely has been crowded out of the Christmas number, I should like to say that I and all my friends greatly appreciated that masterpiece of elegant vituperation from the angry pen of Mr. Osborne de Lissa. Of course, there was nothing ridiculous about *this* letter: it was merely amusing in the way that angry people always are amusing. But we did enjoy it. E. J. L. STRONG.

Sir,—I feel that I cannot possibly let Mr. Michelmore Hitchcock's letter pass without comment. I may say that it caused some amusement among the D.R.'s here (Bishops Stortford), most of whom have been despatch riding for nearly two years, and some more, and all of them were motor cyclists before joining up.

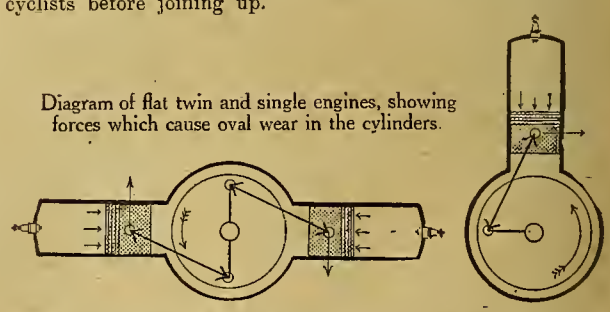


Diagram of flat twin and single engines, showing forces which cause oval wear in the cylinders.

First of all, may I ask Mr. Hitchcock if he has ever ridden on a wet day or on a road that is not quite flat, or ridden a single when it wanted decarbonising? This is when the multi-cylinder scores with its "little patter-patter strokes and feeble explosions." I will not say any more about this

part of the letter, as it is quite obvious to any practical motor cyclist who has ridden both single and multi-cylinder machines (the flat twin for preference).

Now we come to the next part, where he states that the flat twin is not economical, because it wears its cylinders oval. Does not, then, the vertical single wear its cylinder oval? I beg to state that it does, and to practically the same extent.

In the enclosed sketch the arrow heads show the direction of the forces, and the arrows show the direction the engine is turning. To save space I have represented both cylinders of the horizontal twin to be firing at the same time. This is not the case in practice, as they fire at equal intervals. On the exhaust, inlet, and compression strokes the opposite sides of the cylinder receive the piston pressure.

I should also like to ask how it is proposed to lubricate the vertically opposed twin, and what kind of a machine it would prove on the road, with the weight so high in the frame? I should like to hear Mr. Hitchcock's ideas about this. It is my humble opinion that the plug in the bottom cylinder would have a bad time of it in whatever way the engine was lubricated.

As to reliability. Well, ten thousand miles on one machine, in all weathers and under conditions that would turn a civil motor cyclist's hair grey, speak enough on that score. The machine was a Douglas, and I rode it eighteen months and never once had to leave it on the road through a mechanical breakdown. I would not ask for a better machine for its weight and size.

I hope Mr. Hitchcock does not think I intend to be personal, but I think a letter like his shows some types of motor cycle in a wrong light, and might mislead a novice who reads it. He must not think I pretend to be a technical engineer, because I do not, but I have had a little experience on the road, both before and since the war started. I may add that I have no interest in any motor manufacturing concern.

E. KNAPTON, L.-Cpl., Artificer.

Sir,—Having followed with interest several opinions on this topic, I would like to venture my idea.

Within five years of peace being declared, we shall see 2½-3 h.p. singles with two speeds, and sprung front and rear, being sold in thousands at £25 or less simply by standardising and quantity production.

Let us hope we shall do this in Britain without waiting for a Yankee as with cheap four-wheelers. This machine will be so cheap to buy and run that for business purposes there will be a very large demand. As a rider every week-day all the year round to and from business, whatever the weather, after having owned five machines during the last nine years, I consider, for little trouble and expense, the single lightweight is bound to survive.

The splendid behaviour of flat twins will always appeal to long-distance tourists who can afford to buy and maintain them.

My previous experiences from 2¾ h.p. single up to 6 h.p. twin led me six weeks ago to purchase a two-speed four-stroke 2¾ h.p. of British make; I have succeeded with home-made guards in preventing it from plastering me and the carburetter. As you are constantly bringing this important point up in your columns, it is to be hoped makers will attend to it on after-war models.

I do not wear overalls and yet keep clean, but the machine as I bought it would choke up the air gauge on a muddy road in twenty miles by mud flung from the belt, and at anything over 30 m.p.h. mud from the front wheel was all over the rider's legs and on the petrol tank. In spite of the guards fitted, the machine will climb 1 in 6 on a wet day when no rush can be made at it, and also do over 40 on the level, which, after all, is sufficient for the ordinary citizen.

A man, like myself, who makes six journeys per day, *i.e.*, three return journeys to and from meals, cannot waste time putting on and pulling off overalls, much less a doctor who wishes to pay several calls in a day, and who certainly cannot enter a sickroom coated from head to foot with mud.

H. WALKER.

Alexandria, N.B.

AMERICAN BIG TWINS.

Sir,—Like Mr. Bert Houlding, I have followed with great interest your valuable paper, especially on the subject of American machines *versus* English. I ride a Harley-Davidson, not because it is American, but because *no* English machine will give me what I want—that is, *all* the points mentioned in your correspondent's letter—and more, for instance, 28in. wheels and 3in tyres. I *must* have twist grip controls.

I have no object in writing other than that I want to be fair and try to "buck up" our English makers. Like your correspondent, I am English to the backbone, having two sons fighting, and I am on munitions and over age (military), but I use the Harley on special constable work.

R. E. OSBORNE.

Sir,—I have read Mr. Bert Houlding's letter in *The Motor Cycle* of December 28th, and I am more than surprised, after fourteen years' experience, that Mr. Houlding has not discovered a machine of English manufacture to compete against the American in all-round efficiency. Has he ever had the luck to ride and examine such machines as the A.J.S., Sunbeam, etc.? If he has not by chance seen such machines I should say it would be the best for him to do so, and then state where the American so outclasses the English machines of this calibre.

H. A. TOMBLIN.

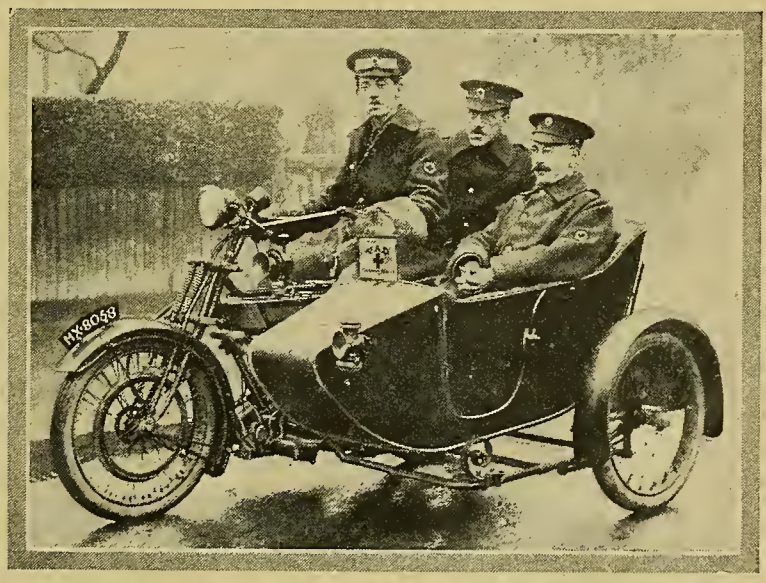
DOING ITS BIT.

Sir,—I am sending you a photograph of my 1916 Royal Enfield combination, which may be seen daily doing its "bit" with the Middlesex Territorial Volunteer Transport (V.A.D.).

Until recently I used a 4 h.p. New Hudson and sidecar, but the frequency with which it is necessary to carry three up made the extra horse-power very desirable, hence my decision to buy the Enfield. This is one of *the only two sidecars in Middlesex* which are authorised to carry the Motor Transport plate (seen on sidecar), and even now, as you point out in a recent issue, I may not take wounded on board when on convoy work.

It is a curious thing that sidecars are used for this express purpose in some parts, but here I have several times seen slightly wounded cases standing in a queue waiting for the cars to return from the hospital for them, but the sidecars have to stand idle. Our detachment (Middlesex 25th, Muswell Hill) at present has vacancies for bearers (not motorists) and, if any of your readers living near would like to share in this interesting work, I shall be pleased to put them in touch.

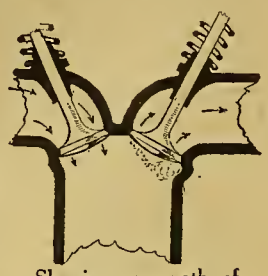
ARCHIE HANDFORD.



Members of the Red Cross Voluntary Aid Detachment, Transport Service, on a 6 h.p. Enfield sidecar. (See Mr. A. Handford's letter.)

THE FLAT TWIN AT THE BAR.

Sir,—With regard to Mr. Bradshaw's recent article on the flat twin, I see the case against this engine was very ably stated by Mr. Osborne de Lissa in your issue of December 14th. The shading in Mr. Bradshaw's original sketches indicates what he terms a "hot side" to the overhead valve engine, but he does not, apparently, consider his own design gets hot anywhere. He also shows what a perfect run in and out the gases have on his engine, but apparently forgets they burn in the cylinder; and do not stream straight through the inlet and out of the exhaust. The bend in the pipe of the o.h.v. engine would cause practically no obstruction—the gases would merely pile up there ready for the next inlet. The gas passages are much freer in the o.h.v. engine, without the disadvantage of a pocket.



Showing easy path of gas adopted in many aero engines. (See letter "A.A.S.")

However, surely a clever designer of Mr. Bradshaw's ability must realise that the parallel arrangement of the valves as shown for the o.h.v. engine is not the best, placing, as it does, a very definite limit on the valve diameter. In the aero world, practically every engine with any pretence to efficiency has valves arranged as in the enclosed sketch. The easy path of the gases is at once apparent, as is also the fact that the valves and ports are limited in size only by the designer. This design is obviously better adapted to the single-cylinder engine, and, practically, we mount the hottest part of the cylinder in a position where, if distortion does occur, it does not affect the cylinder bore. Lest critics arise, I hasten to add this valve arrangement presents no difficulty of operation.

Bournbrook. A.A.S.

Sir,—I have read Mr. Osborne de Lissa's remarks with considerable care, but as they appear to contain very little technical or practical information for the motor cyclist, and as I am much more interested in helpful discussion than in replying to unpremeditated personal attacks, I am afraid I must ignore many of his remarks.

There are, however, one or two details that merit attention, the first being his preference for a hot side to a hot top, because, as he says, with the hot side the piston and the oil which it brings up can conduct the heat away—where to, he does not say. I will leave the motor cycling public to judge for itself whether it wants the lubricating oil to serve the double purpose of lubricating the engine as well as cooling the cylinder, or whether it would prefer the oil to be kept at as low a temperature as possible, so as still to retain its lubricating properties. Personally, I much prefer the working parts to be kept as cool as possible, and to transfer the heat to some other part that does not matter, and with this I have no doubt the majority will agree.

With regard to plug electrodes dropping into the cylinder, and wonderful drawings that were to astonish the world, I have nothing to reply, as in the case of the former the A.B.C. engine is very easy on plugs, and I have no knowledge of the latter.

If Mr. de Lissa, instead of referring so much to the supplying of racing engines for commercial purposes, had suggested wherein lie the peculiarities of the A.B.C. that make it a racing engine, he might have brought to light some particulars worthy of discussion.

As a matter of fact, it is perfectly obvious, even to the casual eye, that the aims in the A.B.C. design are improved cooling, absence of vibration, exceptionally long life, perfect smoothness, capacity for continuous heavy duty, and correct and regular oiling. These features stand out in every single important departure from orthodox practice that can be found in the design, and surely these are essential to the touring motor cycle of the future.

Perhaps the addition of rear springing, two separate cushion drives, four-speed gear box, leaf front springing, etc., are further points that made Mr. de Lissa think the A.B.C. is a racing machine.

If Mr. de Lissa cannot see the advantage in fitting a four-speed gear box, I would advise him to try a comparison of such with a three-speed gear box, and I would also remind him that in car design there were originally many who belittled the four-speed gear box, until they evolved an engine that was capable of taking advantage of the extra ratio, and it has rapidly become adopted in most cars.

The A.B.C. does not *necessitate* a four-speed gear box; but the engine has peculiar qualities which make the machine much more efficient with such fitted, and high efficiency is our chief aim.

Mr. de Lissa's innuendoes regarding wear in actuating rods, rendering three, and in some cases only two, speeds obtainable, are quite sufficient to show that he has never observed the ordinary orthodox car practice of the A.B.C. design.

With regard to cast iron suitable for mangles and bedsteads, I confess to inferior knowledge of the subject, as my time has been devoted to materials of high class.

Whilst on this matter, I would like to clear up an impression that the A.B.C. is not being produced on account of the war. I should be pleased to show Mr. de Lissa, any week he cares to make a visit to our works, at least 100 A.B.C. engines in the course of construction and testing.

GRANVILLE E. BRADSHAW.

AN UNUSUAL JET.

Sir,—In a letter from the Rev. G. T. Basden, Awka, Nigeria, West Africa, occurs the following, which we thought would interest your readers (letter dated November 10th, 1916):

"My only neighbour here came in a week or two ago with his machine. It is a two-stroke Junior Triumph. His carburetter had broken down. The collar holding the jet tube in position had broken in two. That had given way, and he lost the jet tube. I worked at it, and faked up a jet out of a rusty 2in. wire nail, and strapped the part together with wire. He is now getting thirty miles more per gallon when running. I doubt whether there is another machine in the wide world fitted with an old nail as a jet. What do you think? He has sent for another jet, but states that he will not change the present profitable arrangement."

T. BAKER AND SONS.

F. R. MULLIN.

A NEW PETROL.

Possibilities of Government Oilfields and Control over Petrol Interests.

THE new petrol, of which we spoke vaguely last week, is to be known as B.P. spirit. It was available from Monday last, and will be handled by the British Petroleum Co., who, as everyone knows, until quite recently were the factors of the well-known Shell motor spirit. The company has handed over its original stock of tanks, lorries, cans, etc., and until the completion of its new bulk storages and plant, which are in the course of construction, the Anglo-American Oil Co., Ltd., is to store the new B.P. spirit for the British Petroleum Co. The B.P. spirit will be sold in three grades as follow:

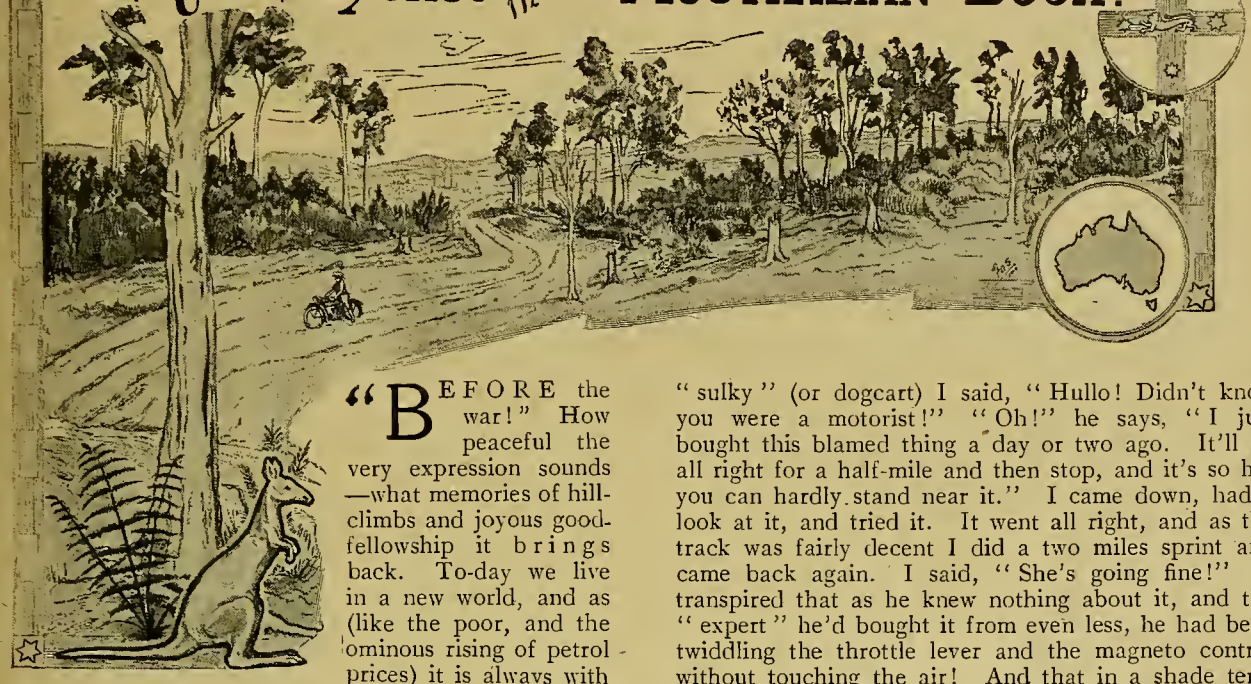
No. 1 in straw coloured tins and priced at 2s. 10d. per gallon.

No. 2 in half straw and blue tins at 2s. 9d.

No. 3 in blue tins at 2s. 8d.

The whole of the share capital of the British Petroleum Co. is vested in the Public Trustee, while its affairs are to be controlled by directors approved and in four cases appointed by the Board of Trade. These facts, coupled with the fact that the Board of Trade made the arrangements for the company to commence the sale and distribution by January 1st, cause one to pause and ponder. It is quite conceivable that at an early date the British Government may acquire and exploit oilfields, and so rid this essential industry of the foreign interests which have existed hitherto.

A Motor Cyclist in the Australian Bush.



"BEFORE the war!" How peaceful the very expression sounds—what memories of hill-climbs and joyous good-fellowship it brings back. To-day we live in a new world, and as (like the poor, and the ominous rising of petrol prices) it is always with us, the reader may pardon a few reminiscences of that old and gone world.

"Before the war" I was spending a quiet existence in the Australian bush. Our business was in a small township in the Riverina district of New South Wales. We were in the store-keeping line, and sold everything from a Ford to a Massey-Harris binder! The population was about five hundred, but the little town served a huge area. I had been for years a motorist in the Old Country. In Melbourne I had done a fair amount of motor cycling during a short stay, but my introduction to an average bush road took place a week or so after my arrival in the "back-blocks." It was on an "Amurrican" car with a "live" Amurrican driver—and in the dark. I was never nervous, but I felt "real blue" that night. The road lay through fairly dense bush and the track was just wide enough for the car. I think that for every yard we were on the track we were two in the air. The twistings and turnings, and the head lights beaming along on the dust ahead, kept one's heart in one's mouth all the while, and the vision of a crash ever imminent. We got home O.K., but my sleep that night was a tangle of Fords climbing trees to find that squirrel, of Rolls-Royces doing the Gaby glide in a forest, and of mo-bikes holding a bouncing competition! After that I gave up all thought of motor cycling! One day, however, whilst driving, I saw some distance away a "'bus" propped up against the fence of a wheat paddock. The "'bus" owner was sitting on the fence, and as we came nearer I recognised the blissful countenance of a friend, a young Methodist parson. The "hot air"—from the bicycle—was percolating heavenwards. The parson was dusty, hot, and perspiring, and the look on his face was akin to that so aptly described in *Punch* as "the profane silence." From the "sulky" (or dogcart) I said, "Hullo! Didn't know you were a motorist!" "Oh!" he says, "I just bought this blamed thing a day or two ago. It'll go all right for a half-mile and then stop, and it's so hot you can hardly stand near it." I came down, had a look at it, and tried it. It went all right, and as the track was fairly decent I did a two miles sprint and came back again. I said, "She's going fine!" It transpired that as he knew nothing about it, and the "expert" he'd bought it from even less, he had been twiddling the throttle lever and the magneto control without touching the air! And that in a shade temperature of over 100°! (Q.E.D. Given a 2½ h.p. two-stroke, under similar conditions. State temperature of surrounding district!)

A First Taste.

But that short run sealed my fate. I had tasted of the wine and it had gone to my head! Soon afterwards I picked up a single-geared free-engined Bradbury, and persuaded a pal to go in for a Triumph. Then the fun commenced. We used our machines mostly for week-ends at the river Murrumbidgee, which was about twenty miles away. Sometimes we stayed at the house of a friend near the river. At other times we "carried our swag" (*i.e.*, blankets, etc.)—not as the real "swaggie," with his billy-can in his hand and his swag upon his back—but with the "swag" cushioning the carriers and the cooking utensils, etc., slung around us. On these occasions we camped out by the river, got our camp fire and our "flip-jack" expert going, lit our cigarettes, set our lines for Murrumbidgee "whales"—a foot long—and had a lazy, happy time. Between bathing, shooting with a pea-rifle, and talking "motors," Sunday night came all too soon. It says much for our good old British mounts that for nearly a year we ran there regularly without any serious mishap, sometimes with passengers (the aforementioned "expert" being one), and over ruts, dust-traps, and pot-holes that would have made the pre-war racing "K-nut" throw himself in the river. I do not think that any of the home riders (and certainly not the designers!) can form any conception of these tracks. The colour of the soil is reddish, and one moved along in a column of brick-red dust. Even were the surface good, the constant dodging of trees, big stumps, and projecting roots, added to the zigzaggedness of the route, made speed

A Motor Cyclist in the Australian Bush.—

impossible. And then there were huge pot-holes, sand drifts, ruts, a blazing sun, and aching arms and bones. To parody a well-known poem—

"So many tracks that wind and wind,
But with no chance of doing a 'blind.'
Or any burst of speed!"

A Snake causes a Spill.

Coming home one Monday morning my chum ran over a black snake which got mixed up with his front wheel and got smashed. The bicycle was running in some heavy dust and it came a beautiful croppér. The only damage was a pair of bent handle-bars.

We had, of course, on such tracks many minor spills, but as one could not drive fast we got off with small damage. Rabbits were there by the thousand, and at night we bowled many over. We had some good long runs to places like Wagga-Wagga, the Rock, Junee, and Coolamon. My petrol consumption worked out about 85 m.p.g., and in the matter of lubrication I got by far the best results from Price's Huile de Luxe.

Weather Conditions.

The bush is wonderfully still and silent. Except when accompanying rain and duststorms, there is never any wind. In the cool winter evenings conditions were perfect for running. Practically the whole year round there was sunshine, and in the middle of winter I have seen the temperature over 80° in the shade. It was gloriously healthy. But when the rain came it usually rained a year's supply in three days. We got caught in one rainstorm, and were, after five minutes of it, going to abandon our machines, when we saw a "cocky's" (farmer's) house, and pushed them there. We did not get away till midday, and the tracks were a mass of sticky clay. Oh! for these wide mudguards! We stopped every half-mile or so to clear away the conglomeration of Australia that blocked the wheels—and cursed volubly! Did space permit I could tell of summer duststorms, when Egyptian darkness fell upon us at noonday, and one became as Lot's wife—a pillar of dust (not salt!); of days when the bush fires raged and the shade temperature soared to 120°, and when not only the engines sweltered but the handle-bars got excessively hot.

The Overseas Market.

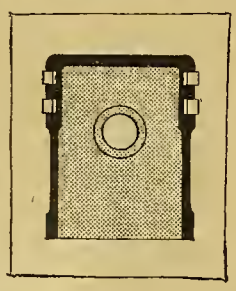
When will our manufacturers awaken to the possibilities of the Colonial market? In Australia nearly all the working men can afford a machine. I noticed before I left that large numbers of the shearers, who go from station to station, had given up their horses and taken to motor bicycles—mostly Triumphs. From what I hear I believe that now the American machines are replacing them all. It will pay our manufacturers to lower considerably the prices charged in the Colonies, sell at a fair margin of profit, oust the American competitors from the field, and, as the Scotch saying has it, "Keep our own fish guts for our own sea-maws!"

In conclusion, I should like to see all designers of Colonial models have six months running over bush roads on an ordinary British machine. We would then see the spring frames, wide mudguards, high clearances, split-pinned nuts, and general accessibility that the soul of the Colonial rider longeth after. With attention to the price question I venture to prophesy that, as in the days before the war, so shall the days after the war be, and British material, British finish, and British reliability rule in the motor cycle markets of our mighty Empire. McK.

INCREASING SPEED.

A Reader's Suggestions for Improving the Speed of his Motor Cycle, and a Warning.

MR. ROBT. BAKER WHITTICK writes: "I find that more speed can be obtained from a Triumph by fitting a fairly large jet and giving the carburetter plenty of air. Another good scheme is to turn down the part of the carburetter to which the float chamber is attached, and so raise the jet until it comes almost in a line with the air inlet.



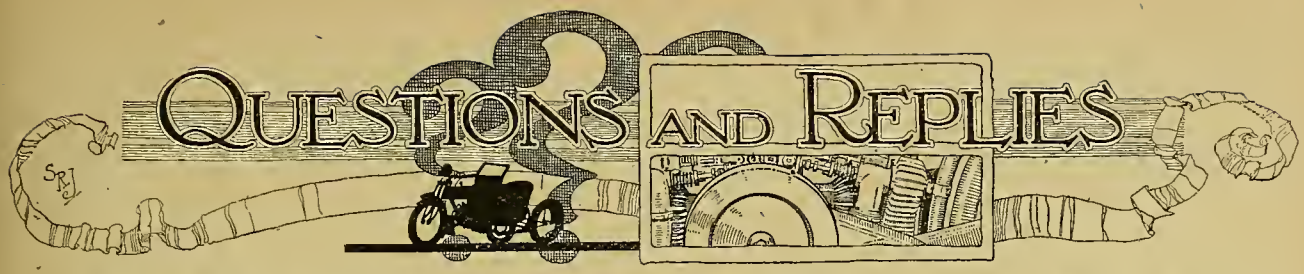
"An appreciable difference is also made by fitting stronger valve springs, and by making the present Triumph cut-out open to four holes instead of two. The back pressure in the engine is considerably reduced without causing very much more noise. Yet another tip for increased speed is to reduce the bearing surface of the piston by grinding the skirt, as shown in the sketch."

Our correspondent's ideas are quite sound, but a word of caution is required on one or two points. The carburetter is a delicate instrument and is easily put out of order. When cut down as suggested, it is clear that if the alteration does not prove a success it will be impossible to restore it to its original form.

His next idea is "stronger valve springs." This is another point in which discretion is required, for, although weak valve springs cause lack of speed and power, the effect of fitting over-strong springs may result in broken valves, broken tappet rocker rollers and studs, in addition to causing loss of efficiency owing to the power required to raise the valve against so strong a spring. It is therefore necessary to strike a happy medium.

His third suggestion is to open the cut-out holes in order to reduce the back pressure. Of course, this is a "sound" idea, and would undoubtedly have the desired effect, but with the increased speed and power the noise of the exhaust is also increased, and is likely to attract the unwelcome attentions of the police. The most efficient way of dealing with this problem is to fit a good-sized tail pipe to the silencer, as is done on most of the latest models. In this way the back pressure is reduced, while the noise is not unduly increased.

The fourth suggestion is also quite a good one, but here again a word of warning is necessary. Great care is needed to see that there is sufficient metal to allow for the recess to be turned in the piston. If the metal is reduced too much a fracture is very liable to occur.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C., and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Motor Cycle Licences.

Is it legal for a motor cyclist holding a driving licence to drive another man's motor cycle, the owner having paid Inland Revenue tax and registration fee?—J.G.M.

Yes; provided the machine is registered and the tax paid by the owner, anyone may use the machine if he hold a driving licence.

Gear for Twin.

In reading the report of a run to the Welsh Coast, in your issue of November 16th, I note that you state the top gear is $5\frac{3}{4}$ to 1.

Now, I should like to ask you is that gear too low for a 6-8 h.p. twin 1913 Rex de luxe, and will it affect the internal wear of parts? Speed never exceeds twenty miles per hour. I do plenty of hill work: single figure gradients.—T.J.J.

We would certainly say that $5\frac{3}{4}$ to 1 is too low a gear.

If a high average is attempted with such a low gear, excessive wear is bound to result.

Valve Timing.

I shall be obliged if you will tell me whether this timing would have a tendency to cause overheating and high petrol consumption: If the exhaust valve starts to open $\frac{9}{16}$in. from the bottom of the stroke, is fully open about $\frac{3}{16}$in. past the bottom, and quite closed just past the top. The inlet starts to open about $\frac{5}{16}$in. before reaching the top, fully open $\frac{1}{4}$in. past the top, and quite closed about $\frac{3}{16}$in. past the bottom.—A.M.

The timing of your engine is rather exaggerated. Of course, makers' timings vary considerably, and it is possible that yours is the most suitable for that type of engine. We would suggest the following timing as being more suitable for most engines for ordinary touring: Exhaust valve to close on top dead centre slightly after rather than before the dead top; inlet valve to open immediately the exhaust has actually closed, and should remain open until the crank reaches the bottom dead centre, or very slightly over, say, until the piston has risen 1 mm. on the compression stroke. The opening of the exhaust valve can be left to the cam design. As a rule, the opening point will be found to be about one-seventh the length of the piston stroke from the bottom of the firing stroke.

Twin Lubrication.

I have been troubled with an overheated front cylinder on my 5-6 h.p. V twin motor cycle. It has the usual hand oil pump on the side. Would you recommend the petroil system to help to lubricate front cylinder?—J.M.G.

Make sure that the baffles of the crank case are removed from the orifice of the front cylinder, and also that the piston rings are not too tight a fit. If these two points are in order, it might be advantageous if you fit a bypass to the oil feed pipe and lead a small supply direct to the front cylinder. To do this, drill a hole near the bottom of the stroke in such a position that when the piston is at its lowest point the hole registers roughly with the centre of the piston. Fit in the hole a union, and connect up the auxiliary oil pipe. The additional petroil system would supply extra oil to rear cylinder also, which is undesirable. It is further inclined to make the whole machine oily.

In submitting to the Editor articles, photographs, or drawings, contributors are asked to mention whether the illustrations are exclusive, and further to enclose a stamped addressed envelope for return of unaccepted contributions

Taking Down an Engine.

What tools are necessary to enable me to take down my motor cycle engine? My machine is a 1909 $3\frac{1}{2}$ h.p. Triumph, and I find that all the nuts are too tight to be moved with the ordinary tools. I find I cannot remove the cylinder without removing the engine from the frame, and the holding-on nuts are very tight. Which is the best way to remove the valve caps?—G.A.

Ordinary engine spanners, such as are supplied by the company, should suffice. If these are not sufficient, the only thing you can do is to employ brute force and remove the nuts with the aid of a cold chisel and a hammer, replacing them afterwards with new ones. When you have removed the nuts from the holding-down bolts, we think that if you take the cylinder in the left hand, hold the engine pulley with the right, and work round the piston to its lowest point, or if you tip the cylinder forward, at the same time turning the pulley so as to move the piston to its lowest point, you will be able to remove the cylinder without taking the engine out of the frame. The best way to remove the valve caps is first of all to squirt paraffin round the edges overnight, and then get a spanner fitting them exactly, and either a lead hammer or a heavy mallet, and hit smartly with a series of good strong blows.

Who is Liable? Driver or Owner?

Is it possible for anyone to be summoned for riding a motor cycle which belongs to someone else, and is registered in that person's name, and which has only been lent to the driver?—S.P.

Yes, a man can be summoned for any offence under the Motor Car Act, even if not riding his own machine, but cannot be fined for driving the machine because it is not registered in his own name. If, however, the owner of the machine has not registered and paid the necessary taxes, the rider of the machine is then liable for riding an unregistered motor, whether it is his own machine or not.

Weak Magnets.

My Bosch magneto does not give a very strong spark; do you think it wants remagnetising, and also do you consider I could do it? I have a 50 volt D.C. electric plant for lighting my premises. I believe the remagnetising is a simple job if one knows how to set to work on it.—ATMOS.

The weak spark of your magneto may not necessarily be due to weak magnets You can usually tell whether they are in order by turning the armature shaft round, and, if a fairly strong resistance is felt, then you will know the magnets are all right. Overhaul the magneto thoroughly to make sure all other points are in order, the carbon brush and slip ring quite clean, contacts clean and making and breaking contact properly, and so on. We would not advise you to try remagnetising the magnets yourself. With the proper appliances it is a very simple job, but unless properly done the result may be worse than the original trouble. The usual method of remagnetising is by the use of an electro magnet. The magnet to be treated is placed end to end with the electro magnet—opposite poles together. The current is then switched on and off, and the magnet very soon becomes recharged, so to speak, with magnetism. Different makers have different methods, however.

Illuminating the Number Plate.

I have been a reader of your most interesting paper for just on six years, and I have obtained many useful hints from it. I should be extremely obliged if you would tell me if the rear number plate of a solo motor cycle has to be illuminated at night.—W.P.H.G.

Only one number plate on a motor cycle need be illuminated. This may be either the back or front number plate.

Scored Cylinder.

I bought a 1912 Rex 6 h.p. and sidecar last year. On taking it down I found one of the gudgeon pins had worked loose and scored the cylinder from the top to the bottom. I am afraid it has gone too far for reboring, as it has quite a groove in the cylinder. Would it be best to put it back as it was and let it run itself out or have it rebored? Would there be great loss of compression?—E.P.

We should advise you to fix the gudgeon pin securely in its place. The effect on compression will depend very much upon the depth of the score. You can find this out by testing. It may not make much difference to the running of the engine. Reboring and fitting a new piston is the only real cure.

READERS' REPLIES.

Acetylene Lighting Troubles.

Perhaps the following tips will be of use to "J.S.P." (Dec. 14th): If the small rear light burner is removed and a small bicycle burner put on instead, vibration will not shake it out, as a slightly larger supply of gas is used, and at the same time the difference to the front light is hardly noticeable. To save rubber tubing, I use the outer member of the Bowden cable covered with ebonite and connect with small pieces of rubber tubing. This has answered my purpose for over twelve months without trouble.—S.P.T.

Misfiring in a Twin.

In your issue of October 12th there is a query by "H.C." His front cylinder does not fire till the engine is raced. I had similar trouble with my A.J.S.—bad misfiring, except at high speeds. I looked for all you suggest—air leaks in induction pipe, valves seating properly, valve springs in good order, changed plugs, platinum points clean, and breaking properly. Result, nil. Lastly, I checked over tappet clearance, and found in the front cylinder that I had adjusted up too closely, probably causing slight overlap. I slackened off till the magneto gauge would easily slip in between the tappet and the valve stem, and misfiring at once ceased. The machine now runs perfectly again.—(Rev.) A. M. Walmsley, Kandy, Ceylon.

Broken Gear Spindles.

In the issue of December 14th you reply to "G.H." *re* Scott gear. I may be able to throw some light on the subject. I do not know if the 1912 edition is different from the 1914, but in the latter there is no lock nut to fix the gearshaft cones, or, as it is called in the list of parts, gear hollow spindle, which has a long screw on the gear pedal end and a short screw with collar on the opposite end. To describe how two of these are fitted on different machines: First put into place with balls and cones and with the short screw cone screwed up to the shoulder, screw up the right-hand cone on the long screw, and then measure from the end of the spindle to the back of the cone. (I am presuming the cones tightened on the balls before they tightened against the ends of the threads.) Now take out the spindle and screw the cones up tightly to the end of the thread and measure again. The difference represents the thickness of the washer to be placed between the left-hand cone and the collar on the spindle; if, however, the cones tighten on the spindle before the bearing is tight enough, *i.e.*, there is still slackness in the bearing, the end of the spindle at the long screw end where the cone abuts must be turned down, a little at a time, till the bearing is in adjustment. In both the spindles I fitted it was a case of putting in washers to prevent the cones screwing up too tightly. It requires a bit of patience to get them just right, but unless they are the long screw cone will tighten up in running and cause the trouble experienced by your correspondent. Where I have spoken of right or left-hand cones I mean as viewed when seated on the machine. Thus the right-hand cone is that on the long screw, and the left-hand cone that on the short screw end of the spindle.—D. G. Taylor.

RECOMMENDED ROUTES.

Aldershot to Berkhamsted.—P.A.L.

Aldershot, Farnborough, Bagshot, Ascot, Windsor, Beaconsfield, Chesham, Berkhamsted. Approximately forty-five miles.

Llantrisant to Kidderminster.—J.W.

Llantrisant, Pontypridd, Quaker's Yard, Nelson, Newbridge, Pontypool, Usk, Monmouth, Ross, Ledbury, Malvern, Worcester, Kidderminster.

Chippenham to Dorchester.—R.N.B.

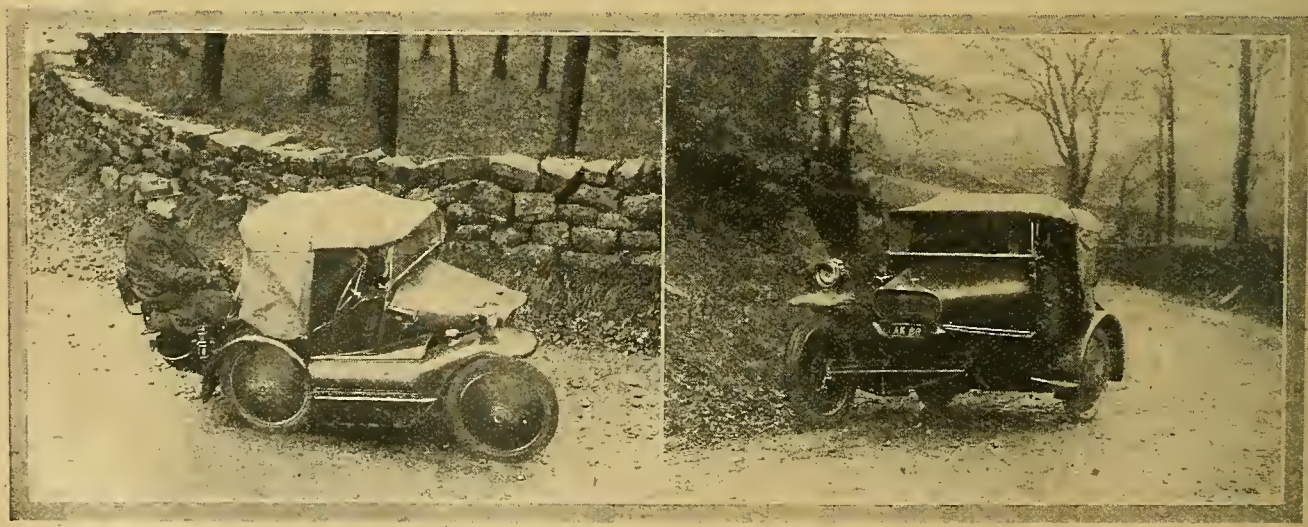
Chippenham, Melksham, Westbury, Warminster, Shaftesbury, Blandford, Whitchurch, Puddletown, Dorchester. Approximately 96 miles.

Staines to Cardiff via Gloucester.—J.W.R.

Staines, Windsor, Slough, Maidenhead, Reading, Wantage, Farringdon, Cirencester, down Birdlip (good road), Gloucester, Newnham, Chepstow, Newport, Cardiff.

London to Newtown.—G.H.

London, Edgware, Rickmansworth, Watford, Berkhamsted, Tring, Aylesbury, Bicester, Hopcrofts Holt, Chipping Norton, Moreton-in-the-Marsh, Broadway, Pershore, Worcester, Tenbury, Ludlow, Bishop's Castle, Brompton, Kerry, Newtown. Approximately 193 miles.

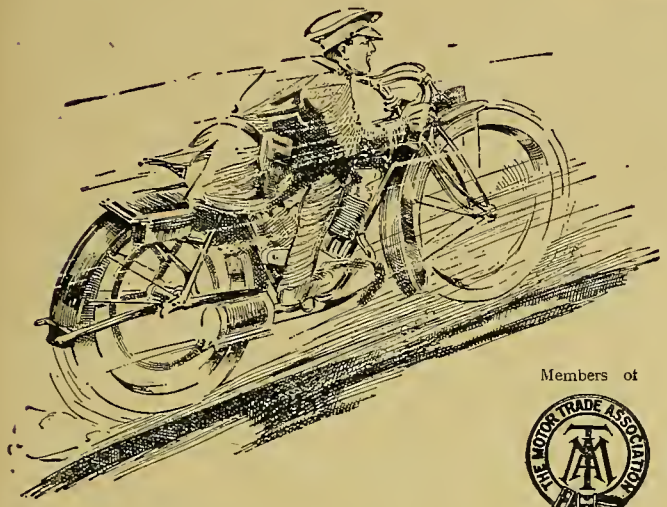


TESTING THE SCOTT SOCIABLE AMONG YORKSHIRE HILLS AND DALES (see pages 4, 5 and 6.)

Very complete protection from the weather is provided by the hood, screen, and side curtains for the driver and passenger. This was much appreciated midst the rainstorms when crossing the hills and dales of Yorkshire The dickey seat is good—particularly in fine weather!

A.V. Magnetos

BRITISH THROUGHOUT



"The Magneto that is not too proud to spark."—*The Motor Cycle.*

WILL positively START UP at a walk; exceptionally lively at picking up; never a sign of misfiring at high or low speeds; miles per hour faster than other magnetos; totally enclosed; dustproof and waterproof.

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Write for Folder "F" and Spare Parts List.

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Electrical Engineers, ACTON, LONDON, W.

MOTOR CYCLES.

SPECIAL NOTICE.

The Ministry of Munitions has given us permit to supply any motors, erected or assembled up to the 15th February, 1917. If Agents, therefore, are desirous of securing motors which we have coming through the works they could be delivered before that date; after that date we expect no more motors can be supplied for the English market.

We have in stock, and in course of construction, the following motors, which we can deliver before the expiration of the date of the Government permit.

MODEL B, 2¾ h.p. Two-stroke.

All latest fitments for 1917.	Cash Price
Single gear	£28 17 6
Two-speed gear	£35 16 6
Two-speed gear, kick starter, and free engine clutch	£39 5 6

MODEL C, 2½ h.p. J.A.P. Four-stroke.

	Cash Price
Single gear	£31 5 0
Two-speed gear	£38 2 6
Two-speed gear, kick starter, and free engine clutch	£41 12 6

MODEL D, 4 h.p. Four-stroke.

	Cash Price
Solo single gear	£41 12 6
With two-speed chain and belt or double chain drive	£53 2 6
With three-speed ditto	£55 10 6
With two-speed as above, with coach-built sidecar, complete	£65 17 6
With three-speed ditto	£68 5 0

Telephone No. 735. MANUFACTURED BY Telegrams—"Engineering."

THE WULFRUNA ENGINEERING COMPANY, LIMITED,
GREAT BRICKKILN STREET, WOLVERHAMPTON.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ____ & Co. ILIFFE & SONS Ltd., and crossed ____

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed, "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C."

☞DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged, when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Spares, prompt delivery.—Cyril Williams, A.J.S. Agent, Chapel Ash Depot, Wolverhampton. [X3491

A.J.S., 1915, 2¾h.p., accessories, perfect; £40; exchange higher power.—Pigot-Disney, E. Molesey, Surrey. [6763

A.J.S. 1912 6h.p. Twin Combination; £40.—Tuke and Bell, Ltd., Motor Dept., Carlton Engineering Works, High Rd., Tottenham, N. [4915

A.J.S., 1913, 2¾h.p., 2-speed, hand clutch, new heavy Dunlop, wind shields, extra panniers, horn, accessories, excellent order, recently overhauled; £22.—Crompton, 4, Fold St., Bolton. (Joining army.) [X3799

A.J.S., 1914, 3-speed, kick start, hand clutch, new tyres, all accessories, £44/10; also another, 1913, 2-speed, kick start, hand clutch, in really good order, £38/10; deferred payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6648

6h.p. A.J.S. 1915 or 1916 Motor Cycle, fitted with De Luxe sidecar, screen, storm apron, 3-speed gear, handle-bar control, free engine and kick start, Watford speedometer, Lucas lamps, Stewart warning signal; this combination is like new, only ridden 750 miles; price 90 gns., guaranteed; this combination should appeal to a purchaser who requires a good and reliable combination.—Wauchope's, 9, Shoe Lane, Fleet St., London. [6732

THERE'S DOUBLE THE NUMBER OF GOOD LINES to choose from at

Wauchope's

TO PROVE IT, CALL OR WRITE FOR TO-DAY'S BIG LIST. IT INCLUDES THESE—

Whatever famous make you seek, New or Second-hand, we hold double the number of Models to be found at any other house, and we offer double advantages in Lowest Cash Prices, Easiest Easy Terms, Fullest Guarantee, and Promptest Delivery.

No.	h.p.		
10800.	3½	1916 3-sp. **SUNBEAM** & S/car.	£65 0
10810.	4-5	1916 countershaft **ZENITH** and sporting Sidecar	£67 10
10814.	2½	1916 2-speed **REVERE**	£35 0
10816.	4¼	1916 3-sp. **B.S.A.** and Sidecar	£65 0
10824.	3½	1913 3-speed **TRIUMPH**	£37 10
10828.	3½	1911 2-speed **HUMBER**	£20 0
10830.	6	1916 **ROYAL ENFIELD** & S/c.	£84 0
10831.	5-6	1915 2-sp. **FAFNIR** and Sidecar	£32 10
10833.	4¼	1916 3-sp. **B.S.A.** and Sidecar	£65 0
10834.	5-6	1914 **A.C.** Sociable	£40 0
10838.	2½	1915 2-sp. **NEW IMPERIAL**	£39 0
10782.	7-9	1916 3-sp. **HARLEY-DAVIDSON** and Sidecar	£100 0
10786.	2¾	1911 Single-speed **HOBART**	£20 0
10789.	8	1914 **HUMBERETTE**	£75 0
10794.	4-5	1914 **ZENITH** Gradua	£42 10
10795.	3	1914 2-sp. **ROYAL ENFIELD**	£42 10
10800.	7-9	1915 3-speed **EXCELSIOR**	£60 0
10802.	4¼	1915 3-speed **B.S.A.**, chain-cum-belt	£52 10
10804.	3½	1913 3-speed **TRIUMPH**	£37 10
10805.	4	1911 3-speed **BRADBURY** and wicker Sidecar	£32 10
10806.	3½	1912 3-speed **TRIUMPH**	£30 0
10808.	3½	1915 2-sp. **SCOTT** and Sidecar	£63 0
10763.	2¼	1916 2-sp. **NEW HUDSON**	£33 0
10768.	3½	1910 single-speed **TRIUMPH**	£20 0
10772.	4	1915 3-sp. **DOUGLAS** and Sc.	£65 0
10776.	3½	1911 single-sp. **LINCOLN-ELK** and Sidecar	£20 0
10779.	2¾	single-speed **WOLF**	£15 0
10739.	2½	1915 2-sp. **NEW IMPERIAL-J.A.P.**	£27 10
10740.	2¾	1916 2-sp. **NEW IMPERIAL-J.A.P.**	£30 0
10744.	2¼	1915 2-sp. **ALLON**	£27 10
10746.	2½	1914 single-sp. **SUN VILLIERS**	£17 10
10748.	2¼	single-speed **HOBART**	£20 0
10750.	4¼	1915 3-sp. **B.S.A.** and Sidecar	£65 0
10751.	8	1915 **MORGAN** Runabout, De Luxe Model	£94 10
10705.	12-16	**VAUXHALL** Car	£125 0
10713.	4-5	1914 **ZENITH-GRADUA**	£37 10
10717.	4¼	**PRECISION**	£22 10
10724.	3½	1912 3-sp. **TRIUMPH** and Sc.	£42 10
10727.	4¼	1915 3-sp. **B.S.A.** and Sidecar	£60 0
10682.	3½	1914 3-sp. **BRADBURY**	£47 10
10687.	1¼	single-speed **J.E.S**	£10 0
10688.	2¼	1911 2-sp. **DOUGLAS**	£22 10
10699.	3	1913 3-sp. **HOBART** & Sidecar	£35 0
10701.	2¾	1911 single-speed **DOUGLAS**	£22 10
10638.	3½	1912 single-speed **INDIAN**	£20 0
10643.	3½	1914 **RUDGE** Multi	£40 0
10649.	3½	1913 single-speed **B.S.A.**	£25 0
10661.	6	1913 **ENFIELD** and Sidecar	£45 0
10673.	4¼	1914 3-sp. **B.S.A.** and Sidecar	£45 0
10610.	2¾	1914 3-sp. **NEW HUDSON,** Sc.	£45 0
10614.	3½	1911 single-speed **HUMBER**	£25 0
10629.	3½	1914 3-sp. **ROVER** and Sidecar	£50 0
10633.	4	1914 3-sp. **SINGER** and Sidecar	£45 0
10587.	3½	1914 3-sp. **QUADRANT** & S'car	£42 0
10588.	3½	1913 **RUDGE** Multi and Sidecar	£45 0
10596.	3½	1913 **RUDGE** Multi	£35 0

WAUCHOPE'S, 9, SHOE LANE, FLEET ST., LONDON.

'Phone: 5777 Holborn. Wires: "Opificer, London."

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

Alldays.

COLMORE Depot, 31, Colmore Row, Birmingham, can supply immediately all models of Alldays Allon. [0796

ALLON, 2-stroke, late 1916, full equipment, beautiful condition, perfect order; 28 gns.—Kuowlden, 47, Bonnerhill Rd., Kingston. [6762

ALLON (1915), 2-speed, mileage about 2,000, tyres unpunctured, excellent condition, accessories; £31.—46, Archfield Rd., Cotham, Bristol. [X3865

NEW Allons, 2-speed, 2-stroke, 2½h.p., 1917 models; £42; easy terms 2% extra, or exchanges arranged.—Wauchope's, 9, Shoe Lane, London. [6735

ALLONS.—All models actually in stock, £37/18 to £47/5; exchanges, easy payments.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6642

Ariel.

ARIEL, 3½h.p., latest 3-speed model, actually in stock.—Crow Bros., Guildford. [6366

ARIEL, 3½h.p., perfect condition, £15/10; sidecar, £4/10.—Smith, 199b, King St., Hammersmith. [6587

COLMORE Depot, 31, Colmore Row, Birmingham, have in stock for immediate delivery all models of Ariel motor cycles, with or without sidecars. [0797

1913 3½h.p. T.T. Ariel, Bosch, B. and B., lamps, horn, speedometer, tyres new, variable pulley, reliable mount; exchange 2-stroke.—The Priory, Swinton Park, Manchester. [X3830

ARIEL, 3½h.p., T.T., late 1915, decompressor, usual accessories, all spares, fitted extra tank, excellent condition; £33, offers.—Horwood, Bungalow, Ascott-under-Wychwood, Oxon. [X3775

1917 New Ariels in stock, 3-speed countershaft gear, clutch, and kick start, chain-cum-belt drive, £65/10; easy terms 2% extra, or exchange arranged.—Wauchope's, 9, Shoe Lane, London. [6734

Auto-Wheels.

AUTO-WHEEL, 1915, like new; £10/10.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6592

SEVERAL Late Model Auto-Wheels, in splendid condition, from £7 to £10 each.—Murray's, 37a, Charles St., Hatton Garden, Holborn. [X3874

Bat.

BAT-J.A.P., 6h.p., about 1912-13, very hot, needs little attention; £15.—Gittins, Ltd., Oswestry. [X3798

NEW Bats from stock, 2-speed gear models, solo mounts; £63/5.—Wauchope's, 9, Shoe Lane, London. [6736

BAT, 1912-13, 6h.p., sporting model, 3 speeds, usual spares; £32.—P. J. Evans, John Bright St., Birmingham. [X3767

BATS.—P. J. Evans, Birmingham agent.—Immediate delivery 4-5h.p. sporting model, 2 speeds; £63/15.—87-91, John Bright St., Birmingham. [X3768

1912 Bat-Jap, 3½-4h.p., Bosch, B. and B., new ball bearing, Grado gear, new Dunlop belt, splendid tyres, Dunlop heavy, coachbuilt sidecar, V.M. Pillion seat, Miller lamps, speedometer, horn; £28.—Letters, 15, Cecil Rd., Hendon, N.W. [6767

BAT-J.A.P., 1912-1913, 8h.p., 2-speed, clutch, spring frame, with coachbuilt sidecar, head lamp, rear lamp, Lucas car lamp mounted on sidecar, mechanical horn, £8/10 just spent on thorough overhaul; bargain, £39; exchange lower power and cash.—Ideal Cycle Co., Thundersley, Essex. [6710

MOTOR CYCLES FOR SALE.

B.S.A.

B.S.A., 1917 models H and K, with sidecars, in stock.—Moss, Wem. [X3860

COLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

NEW B.S.A., chain drive, in stock; exchanges quoted; £66.—Motor Exchange, Horton St., Halifax. [6661

RIDER TROWARD, 78, High St., Hampstead.—1915 4¼h.p. T.T. clutch B.S.A., new condition, very fast; 54 gns. [6744

B.S.A. 1917 Models in stock, H £66, K £64; also genuine B.S.A. No. 1 sidecar, £17/17.—Huckleridge, 133, Sloane St., London. [X2742

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert J. Pitts, Redditch. Tel.: 91. [X0529

NEW B.S.A. 1917 War Office Model, chain-cum-belt transmission, 3-speed countershaft gear and kick starter; £64.—Wauchope's, 9, Shoe Lane, London. [6731

4¼h.p. B.S.A., late 1914, 3-speed, perfect order throughout, lamp, and horn; £52; or with new 1917 Gloria sidecar £67/10.—Duncan, 2, St. Mary's Place, St. Andrews. [X3525

B.S.A., late 1916, 3-speed, 4¼h.p., all chain drive, kick start, Lucas lighting set, only run 200 miles, perfect condition; 55 gns., or near offer.—Box L2,832, c/o *The Motor Cycle*. [6727

B.S.A. Model K, 1916, 4¼h.p., 3-speed, kick start, original tyres, Palmer oversize on rear, coach sidecar and screen; £68/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6645

B.S.A., 4¼h.p., 1915, all chain drive, 3-speed countershaft, run only 3,000 miles, fitted with Swan coachbuilt sidecar, head, side, and rear lamps, speedometer, horn, numbers, very fine order; £58.—Gorleston, St. Alban's Rd., Kingston-on-Thames. [X3868

LATE 1915 B.S.A., 4¼h.p., countershaft 3-speed, clutch, kick-starter, with coachbuilt sidecar, complete with the usual accessories, excellent condition throughout; £57/10, or close offer; exchanges.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [6721

B.S.A.'s.—1917 model H, all chain, £66; 1917 model K, £64; actually in stock; deferred payments arranged; exchanges; good prices for second-hand up-to-date machines.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 69, and Hornsey 1956. [6641

B.S.A. Latest New Models can be delivered from stock: Chain drive model H, 3-speed countershaft gear, £66; chain-cum-belt model K, £64; Montgomery sidecars in stock to fit from 10 gns; your present machine can be taken as part payment.—Elce and Co., 5-16, Bishopsgate Av., Camomile St., E.C. B.S.A. agents. [0551

4¼h.p. 1916 B.S.A. and coachbuilt sidecar, 3-speed, model H, all chain drive, clutch and kick start, in the pink of good condition, complete with accessories 0 gns., guaranteed; also a 1916 chain-cum-belt model, fitted with roomy sidecar, including accessories, £60, guaranteed; and a solo chain-cum-belt B.S.A., 50 gns., guaranteed; easy terms, 2½%, half down.—Wauchope's, appointed B.S.A. City agents, 9, Shoe Lane, London. [6737

Calthorpe

1915 Calthorpe-Jap, 2-speed, and accessories; £22/10.—Bounds, Garage, High Rd., Kilburn. [6580

COLMORE Depot, 31, Colmore Row, Birmingham, have in stock all models of Calthorpes for immediate delivery; also at our Manchester Depot. [0799

CALTHORPE, 2-stroke, 2-speed, practically new, hardly used, fully equipped; best offer over £20; owner France.—Mrs. E., Rinkside, Penrhyn Rd., Kingston, S.W. [6697

NEW Calthorpes on easy terms, 2% only extra charge: Latest lightweights, 2¾h.p. J.A.P. engines, 2-speed Enfield gears, sloping top bars, 36 gns.; also ¼h.p. 2-stroke models, £28/17/6.—Wauchope's, Calthorpe's appointed agents, 9, Shoe Lane, London. [6733

Clyno.

CLYNO 1912 6h.p. Combination; £35/10.—Motor Exchange, Horton St., Halifax. [6663

CLYNO, 1913-14, 6h.p., 3-speed countershaft, chain drive; £39/10.—Motor Exchange, Horton St., Halifax. [6662

1913½ Clyno Combination, spare wheel, speedometer, kick starter, 2 head lamps and generators, hood; £40.—Griffin, Ltd., 89, Gt. Portland St., London. [6617

Connaught.

P. J. EVANS, Birmingham Agent.—Immediate delivery all models Connaught from stock; miniature and double-purpose models, prices from £28/17/6.—87-91, John Bright St., Birmingham. [X3770

Coventry Eagle.

COVENTRY Eagle, 1916, 6h.p., 3-speed countershaft, coach sidecar, and accessories; cost £100, little used, £69/10.—Motor Exchange, Horton St., Halifax. [6665

Douglas.

1913 2¾h.p. Douglas, 2 speeds, splendid condition; £28.—H. Wright, Arlesey, Beds. [6620

1913 2-speed Douglas, speedometer, etc.; £28.—Rhodes, 43, Bryan Rd., Blackpool. [6625

SECOND-HAND BARGAINS

SIDECAR OUTFITS.

REX, 1914, 6 h.p., 2-speed, modele de luxe **£35**
TRIUMPH, 3½ h.p., 2-speed countershaft, Sidecar ... **£32**
INDIAN, 1913, 7 h.p., coach-built Sidecar, 2-speed .. **£42**
ZENITH, 1914, 6 h.p., countershaft clutch model **£60**
RUDGE 1913 5-6 h.p. Multi, with Rudge Sidecar **£46**
ENFIELD, 1912, 6 h.p., 2-speed, twin, Enfield Sidecar **£29**
RUDGE 1913 3½ h.p. Multi, coach-built Sidecar.....***£33**
SCOTT, 1914, 3½ h.p., 2-sp., and Scott sidecar chassis **£45**
ZENITH, 1915 3½ h.p., twin, clutch, and C.B. Sidecar **£49**
ENFIELD 1914 6 h.p. 2-speed Combination ***£55**
CHATER LEA, 1913, No. 7, 8 h.p. 3-sp., and Sidecar.***£40**
DDUGLAS, 3½ h.p., 2-sp., Canoelet, disc wheels.....***£58**
MATCHLESS, 1913, 8 h.p., J.A.P. overhead, 6-speed.***£48**
HARLEY-DAVIDSON, 7-9 h.p., 1915, 3-sp., C.B. S/car. **£68**
P. & M., 3½ h.p., 1913, 2-speed, C.B. Sidecar ***£46**
JAMES 4½ h.p., 1914, 3-speed, Empress Sidecar .. .***£58**

SOLO MODELS.

DOUGLAS, 1914, 2¾ h.p., T.T., long exhaust, 2-speed **£45**
DOUGLAS, 1914, 2¾ h.p., 2-speed, Zephyr pistons ... **£48**
DOUGLAS, 1914, 2¾ h.p., 2-speed, kick-start ***£48**
DOUGLAS, 1914, 2¾ h.p., 2-speed, Model V. ***£47**
DOUGLAS, 1911, 2¾ h.p., 2-speed touring bars **£20**
RUDGE 1913 3½ h.p. Multi, T.T. bars **£33**
IVY, 1915, 2-stroke, siogle-speed **£16**
NEW HUDSON, 1913, 3½ h.p., 3-speed, J.A.P. engine **£30**
REX, 1913, 3½ h.p., 2-speed, and clutch **£28**
BROWN, 3½ h.p. model, Bosch magneto **£12**
INDIAN, 1915, 5 h.p., 3-speed, twin **£48**
ALLDAYS ALLON, 1915, 2-speed, 2-stroke **£32**
INDIAN, 1914, 7-9 h.p., 2-speed, electric equipment . **£47**
ENFIELD, 1910, 2½ h.p., twin, Grado gear **£14**
LEVIS, 1914, 2½ h.p., 2-stroke, countershaft **£18**
F.N., 2½ h.p., 2-speed, lightweight **£15**
ALLDAYS ALLON, 1916, 2½ h.p., 2-speed, 2-stroke .. **£30**
ALLON, 1916, 2¾ h.p., 2-stroke, as new, single-speed **£26**
ENFIELD, 1916, 2½ h.p., 2-stroke, 2-speed **£33**
TRIUMPH, 1913, 3½ h.p., 3-speed, all accessories.....***£38**
INDIAN, 1914, 7-9 h.p., clutch model, as new **£41**
HUMBER, 1915, water-cooled, 3½ h.p., 3-speed.....***£45**
INDIAN, 1915, 5 h.p., 3-speed, as new.....***£46**
PREMIER, 1913, 2½ h.p., lightweight **£14**
TRIUMPH, 1913, 3½ h.p., tourist, fixed gear **£19**
INDIAN, 1914, 7-9 h.p., 2-speed, spring frame ***£38**
ENFIELD, 1916, 3 h.p., twin, 2-speed, speedometer.***£48**
HUMBER, 1913, 2½ h.p., twin, had careful usage ***£21**
RADCO, 1915, 2½ h.p., 2-stroke, done about 500 ..... **£20**
TRIUMPH, 1914, 4 h.p., 3 speed, excellent order ***£50**

NEW 1917 MODELS.

ROYAL ENFIELD 6 h.p. Combination **£94 10**
ROYAL ENFIELD, 3 h.p., twin, 2-speed **£57 15**
ROYAL ENFIELD, 2¾ h.p., 2-speed, 2-stroke **£44 2**
B.S.A., 4¼ h.p., 3-speed, all-chain, H, 1917 model . **£66 0**
B.S.A., 4¼ h.p., 3-speed, belt, K, 1917 model.... **£64 0**
B.S.A., 3½ h.p., Model D, T.T..... . **£52 10**
ROVER, 1917, 3½ h.p., 3-speed, Combination **£89 9**
ROVER, 1917, 3½ h.p., 3-speed, solo **£69 10**
ROVER, 1917, 3½ h.p., T.T., Philipson pulley **£61 10**
LEVIS, 2½ h.p., single-speed, Popular model **£32 0**
COVENTRY EAGLE, 2-stroke, de luxe **£37 15**
MORGAN G.P. No. 1, M.A.G. engine, discs, etc..***£150 0**

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LIGHT CARS.

G.W.K., 1914, 8 h.p., just re-painted and overhauled **£120**
G.W.K., 1915, 8 h.p., just re-painted, detach. wheels.***£160**
MORGAN, 1917, G.P. No. 1, only done 500, & as new.***£135**
KNIGHT, 1914, 11.9 h.p., sporting body.....***£145**
CALTHORPE, 1916, 10 h.p., G.D.M. dyn. 6 wheels.***£275**
SINGER, 1914, 10 h.p., dyoamo lighting.....***£195**
SINGER, 1913, 10 h.p., 5 lamps, just being overhauled.***£135**
SINGER, 1913 (late), 5 lamps, dickey.....***£145**
HILLMAN, 1915, 9.5 h.p., speedometer, little used.***£205**
MATHIS, 1914, 15 h.p., 5-seater, dynamo.....***£305**

Machines started (*) are complete with lamps, horn, etc.

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MOTOR CYCLES FOR SALE.

Douglas.

1915 Douglas, W.D., 2-speed, and accessories; £42/10.—Bounds, Garage, High Rd., Kilburn. [6578

DOUGLAS, 1913, 2 speeds; £30.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [6602

COLMORE Depot, Birmingham, Leicester, and Liverpool, for Douglas motor cycles, also spare parts. [0800

RIDER TROWARD, 78, High St., Hampstead.—1913-14 T.T. Douglas, 2-speed, perfect, fast; 33 gns. [6740

1915 T.T. Douglas, 2-speed, speedometer, and accessories; £45.—Bounds, Garage, High Rd., Kilburn. [6579

DOUGLAS, 2¾h.p., 1914, just overhauled, speedometer, lamps, etc.; £35.—Boy 598, c/o *The Motor Cycle*. [X3753

1913 T.T. Douglas, 2 speeds, splendid condition; 28 gns. cash.—436, Whitehorse Rd., Thornton Heath. [6691

DOUGLAS, 2¾h.p., £15/10; 1913 2-speed, wants tuning up, £26.—Motor Exchange, Horton St., Halifax. [6664

DOUGLAS, late 1913, 2¾h.p., 2-speed, semi T.T., first-class condition; £31.—Stocks, Thurlstone, Sheffield. [X3859

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Yeovil. Tel.: 50. [5855

1913 T.T. Single Speed Douglas, overhauled, very fast; £23; perfect.—Jennings, 6, Meadway, Gidea Park, Romford. [6614

DOUGLAS, 2¾h.p., 1915 model, T.T., in fine order, head and rear lamps, horn, numbers; £44.—Fowler, 36, Clarence St., Kingston. [X3870

DOUGLAS, 1915, T.T., 2¾h.p., 2-speed, lamps, horn, speedometer, good condition; £44.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0480

DOUGLAS Specialists.—Gibb, Gough, London Rd., Gloucester. Gibb, the International Douglas rider, winner of numerous cups and gold medals. [2218

DOUGLAS, late 1914, 2¾h.p. T.T. model, in splendid condition, new tyres, belt, chain, etc., all accessories; £35.—Gripper, Babworth, Retford. [X3827

LATE 1913 Douglas, 2 speeds, clutch, kick, lamps, all accessories, pan, splendid condition, little used; 32 gns.—436, Whitehorse Rd., Thornton Heath, Surrey. [6611

1915¾ 4h.p. Douglas, Colonial model, 2-speed, clutch, kick start, coachbuilt sidecar, 2 lamps, and spares; £60; like new.—Young, Sutton-in-Ashfield. [X3812

DOUGLAS, 1914, 2¾h.p., 2-speed, clutch, kick starter, speedometer, mechanical horn, lamps, accessories; £34.—Lt. Hill, 4th Y.L.I., Wellingborough. [X3846

DOUGLAS, 1914, T.T., 2¾h.p., 2-speed, in splendid tune, long exhaust pipe, very fast; £38, or near offer.—R. Kirkby, Estate Office, Hornby, Lancaster. [X3829

1915 2¾h.p. Douglas, W, 3-speed, clutch, engine perfect, ridden very little, nearly new, with accessories; £52/10.—Robinson's Garage, Green St., Cambridge. [6712

1916 Douglas, 2¾h.p., W.D. model, new August, done 500-600 miles, lamps, tools, and Stewart mechanical horn; £48.—Oxford Villas, Laleham Rd., Shepperton. [X3839

GIRDER Frame Douglas, suitable for either lady or gentleman, 2¾h.p., 2 speeds, clutch, footboards, excellent condition throughout; £33.—Alder, 16, East Park Rd., Harrogate. [6657

1914 2¾h.p. T.T. Douglas, 2-speed, new Dunlops, B170 saddle, 2 Lucas lamp sets, horn, Stewart speedometer, excellent condition; £38/10.—Robinson's Garage, Green St., Cambridge. [6714

DOUGLAS, 1916, 4h.p., 3 speeds, kick starter, tyres unpunctured, run 1,000 miles, perfect mechanical condition; expert examination, P. and H. lamps, tools, etc.; £60.—Royal Hotel, Capel Curig. [X3831

DOUGLAS Combination, 4h.p., late 1915, absolutely unscratched, 3 speeds, clutch, kick start, Douglas coach sidecar, speedometer, lamps, Lucas horn, spare tyre; £70.—Pike, Thoroton St., Nottingham. [X3834

DOUGLAS, practically new, War Office, 2-speed, T.T. all-weather model, all grey, fully equipped, smartest on road, perfect; trial; £54, or with cash for 1916 twin combination.—A.E., 23, Market Place, Kingston, S.W. [6698

Enfield.

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

ENFIELD 1916 6h.p. Combination, lamp, horn, new 2 months ago; £85.—Lamb's, below.

ENFIELD 1916 6h.p. Combination, Lucas lamps, Stewart speedometer, horn, mileage slightly over 1,000; £84; Enfield commercial chassis, with quite new box, 12 gns.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169 and Hornsey 1956. [6646

ENFIELD 1914½ 6h.p. Combination, hood, screen, splendid condition; £58.—29, St. Leonard's St., Bow, E. [6575

1913 Enfield 6h.p. Combination, all accessories; £45.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [6603

All letters relating to advertisements should quote the number at the end of each advertisement, and the date of the issue. A21

MOTOR CYCLES FOR SALE.

Enfield.

1916 3h.p. Enfield, mileage 2,000, faultless, speedometer, horn, lamps, shock springs; bargain, £49.—32, Steade Rd., Sheffield. [X3843

RIDER TROWARD, 78, High St., Hampstead.—1916 Enfield combination, mileage 600, new condition, 3 lamps; cost £110, 68 gns. [6742

1916 Enfield Combination, ridden once, unscratched, perfect throughout; 79 gns.; cheaper machine part.—245, Hammersmith Rd., London, W. [6709

ROYAL Enfield, 1915, 2-stroke, exceptional condition, large black P. and H. head light set, rear light, horn, all tools, only run few miles; £35.—Kitcat, 6, Parade, Cowes. [6608

ENFIELD Combinations.—New models in stock; 6h.p., 2-speed, £94/10; cash, exchange, or deferred payment terms.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0552

ENFIELD Combination, 90 gns.; 3h.p. twin, £57/10; 2-speed, 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

1916 3h.p. Enfield, 2-speed, kick start, Millers head and Lucas rear lamps, mechanical horn, Thompson-Bennett mag., ridden 500 miles only; bargain, £42/10.—Robinson's Garage, Green St., Cambridge. [6715

1917 Enfield, 3h.p., 2 speeds, complete with lamps, horn, and numbers, only ridden 50 miles; cost with accessories £63; officer ordered abroad; sacrifice £55; approval.—Foulor, 36, Clarence St., Kingston. [X3872

ENFIELD Combination, 1916, perfect condition, hood, luggage carrier, spare covers and tubes, lamps, horn, speedometer, many spare parts and tools; 67 gns.—Crawley Bros., 45, Hockerill St., Bishop's Stortford. [6633

BIRMINGHAM Enfield Agent, P. J. Evans, 87-91, John Bright St.—Immediate delivery all 1917 models, including lighting set combination, special 8h.p. with hood and screen, and standard 6h.p. combination, also 3h.p. standard and sporting models, and 2½h.p. 2-stroke; prices from 42 gns. [X3764

ENFIELD 1916 6h.p. Combination, Lucas dynamo lighting, electric and bulb horns, screen, apron, spare tyre and inner tube, spare chain and valve, inspection lamp, luggage grid, Pillion seat, mirror, Watford speedometer, new May last, done 2,720 miles; £90, no offers.—51, Park St., Birmingham. [X3756

ENFIELD, just arrived, dynamo outfit, 6h.p., hood and screen, £115/15; also 6h.p. 1917 standard combination, hood and screen, £100; 3h.p. solo models, T.T., touring, £57/15; actually in stock; good prices offered for second-hand up-to-date machines in part exchange; deferred terms if desired.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6643

Excelsior.

EXCELSIOR, 1916, 7h.p., 3-speed, and coach sidecar, used for demonstration; £69/10, cash bargain.—Motor Exchange, Horton St., Halifax. [6666

AMERICAN Excelsior, Model de Luxe, 4 electric lamps, speedometer, Canoelet sidecar, wind screen, hood, bought week ago; owner ordered Front; bargain, £90.—97, Divinity Rd., Oxford. [X3801

Fafnir.

FAFNIR, in splendid condition, new mag.; £22/10, or nearest offer.—Crawley Bros., 45, Hockerill St., Bishop's Stortford. [6632

F.N.

F.N., 1914, 2½h.p., 2-speed, clutch, as new; £28; exchanges entertained.—C., Holly Lodge, Radnage, near Stokenchurch, Bucks. [6609

3½h.p. F.N., 4 cyls., recently overhauled and re-enamelled, excellent running order; £20, or near offer.—Box 591, c/o *The Motor Cycle.* [X3695

2¾h.p. F.N., Bosch mag., clutch, splendid condition, £10; also 1912 F.N., 4-cyl., clutch, £15.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [6603

Harley-Davidson.

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for immediate delivery of Harley-Davidsons. Spares, 24 hours' service. [6244

1915 Harley-Davidson, electrically equipped, excellent condition, with Swan sporting sidecar; £66.—Renier, 15, Cresswell Rd., Twickenham. [6703

1915 Harley-Davidson, electric model, and Gloria sidecar, perfect order; £55, or exchange.—Howes, 19, Limburg Rd., Clapham Junction, S.W. [6765

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802

HARLEY-DAVIDSON 1916 Models delivered from stock on the best terms for cash, exchange, or easy payments; sidecars in stock to fit.—Below.

HARLEY-DAVIDSON, 1915, 7-9h.p., 3-speed, model 11J, electric lighting, horn, etc., with Harley model A sidecar, complete; £63.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0492

LATE 1915 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0861

1915½ Harley-Davidson Combination, 3 speeds, Canoelet sidecar, dynamo electric lighting, horn, new speedometer, tools, spares, condition A1; £70 cash.—Box L2,758, c/o *The Motor Cycle.* [6218

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MOTOR CYCLES FOR SALE.

Harley-Davidson.

HARLEY-DAVIDSON 1916 Model 16F, and Canoelet car, wind screen, big F.R.S. lamp, Stewart horn, ridden 600 to 700 miles approximately, really good thing; £89/10; deferred payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6647

HARLEY-DAVIDSON, 7-9h.p., 16J model, with Gloria coachbuilt sidecar, hood and screen, complete with electric lighting outfit, spare tyre, tube, speedometer, and tools, done 900 miles, excellent condition; cost £110, accept £85.—Harley, c/o Staines Projectile Co., Ltd., Staines. [6728

Henderson.

RIDER TROWARD, 78, High St., Hampstead.—1915 Henderson, Bramble 18 gn. underslung sidecar, dynamo lighting, electric horn, new condition, mileage 2,000; cost £110, 65 gns. [6745

Hobart.

HOBART Motor Cycle, scarcely used; owner gone to the Front.—Particulars, Mann and Overtons, Ltd., 10, Lower Grosvenor Place, S.W. Tel.: Victoria 4634. T.A.: Sonpape, Sloane, London. [6699

Humber.

1912 3½h.p. 2-speed Humber, handle starter, very good; £18/10.—Stocks, Thurlstone, Sheffield. [X3858

1914 3½h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863

HUMBER Combination, 3½h.p., 2-speed, free, mag., B. and B., fast, in fine order and condition; £18.—Head, 31, Hamthorpe Rd., West Norwood. [0870

HUMBER, 1915, 3½h.p., 3-speed, nearly new; special price, £57/10.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0842

1917 3½h.p. Humber, twin horizontal engine, semi-T.T. bars, handle-bar controlled clutch, quite new, just delivered, £75; with Mills-Fulford coach sidecar complete, £88; Douglas machines taken in part exchange.—Robinson's Garage, Green St., Cambridge. [6713

Indian.

INDIAN, 1915, 7-9h.p. road racer, lamps, horn, tools, spares, mileage about 5,000; £40.—Bristow, Lanercost, Wallington. [6738

7-9h.p. Indian, 1916, 2-speed clutch, Gloria torpedo sidecar, with lamps; £75; kick starter.—Williams, 10, King St., Twickenham. [6606

INDIAN, 7-9h.p., spring frame combination, beautifully equipped, new chains and tyres; called up; best offer.—G., 1, Kensington Park Rd., W. [6700

INDIAN, 1915, 5h.p., 3-speed, lamps, horn, etc., with Phœnix racing torpedo sidecar, fine condition; £58.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0481

INDIANS, model C, in stock for immediate delivery, spring frame, 3 speeds, 2 electric lamps, and horn also speedometer; £78.—P. J Evans, John Bright St., Birmingham. [X3772

INDIAN, 7-9h.p. (1914), good as new, little used; owner at Front; will be sold by auction January 16th, 1917.—Charles Muskett, 88, Station Rd., New Southgate, N. [6621

INDIAN Powerplus, 7h.p., 3-speed, T.T., rigid frame model, Dunlop tyres, £75; spring frame touring model, with lamps and horn, £78.—In stock for immediate delivery at P. J. Evans, John Bright St., Birmingham. [X3766

INDIAN, 1914, 7-9h.p., 2-speed, electrically equipped, spring frame, all accessories, special Montgomery sidecar, Cape hood, screen, luggage carrier; £54.—Adlington, Fulham Military Hospital, Hammersmith. [X3802

INDIAN, 1915, 7-9h.p., 3-speed model C, electric equipment, large Millford de Luxe coachbuilt sidecar, with disc wheel, hood, screen, insurance policy, perfect condition; bargain, £63.—Lelliott, Chatsworth Rd., Worthing. [6768

INDIAN 1914-15 Genuine Coach Combination, 7-9h.p., spring frame, speedometer, lamps, tools, horn, large valuable skin motor rug, back seat; lot 45 gns.; trial.—Wires: Leeming, Westbourne, Vicarage Lane, Marton, Blackpool. [X3864

INDIANS, second-hand 1915 models: 7h.p. model C, with de luxe coach sidecar, £60; 5h.p., 3 speeds, with sporting coach sidecar, £52/10; 5h.p. solo mount, £50; all overhauled and guaranteed sound.—P. J. Evans, John Bright St., Birmingham. [X3762

7h.p. Indian, 1914, 2 speeds, electric light, speedometer, all accessories, with coachbuilt sidecar, whole machine as new; must sell, joining colours; £50, or near offer; seen any time by appointment.—Best, 80, Canbury Park Rd., Kingston. [6766

P. J. EVANS, Birmingham and Midland Indian Agent.—All models in stock for immediate delivery; 7h.p. T.T. Powerplus, £75; 7h.p. 3-speed spring frame, and electric light, £78; sidecars from 11 gns.—87-91, John Bright St., Birmingham. [X3763

INDIAN, 1915, 5h.p., 3 speeds, clutch, kick starter, and Mills-Fulford sidecar, all accessories, spare new Dunlop cover and tube, splendid condition, unused since January, 1916, ideal as solo or combination; £55.—Taylor, Maple Lea, Hindhead. [6634

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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Eliminating Weaknesses.

IN the early part of 1915 we ventured the suggestion that experts in motor cycle matters should be appointed by the Government to study the conditions under which motor cycles are used at the Front, and to make recommendations to manufacturers engaged entirely upon the production of war models. The object in view was, of course, the perfection of design by the elimination of weak points. It is common knowledge that certain details of design (we can fairly include all motor cycles in use at the Front) were entirely satisfactory when used under conditions obtaining in these Isles, but quite naturally perhaps were found to be lacking in strength or efficiency under the arduous conditions of war service. To particularise, we refer to frames, hub design, gears, the important question of mudguarding, spring forks and such like. Engines in isolated cases have not proved all they might be, and sidecars, too, have been found to be wanting in design. From accounts we receive from men at the Front who are competent to judge, certain troubles are still regularly experienced with specific makes of machines. These failures have been recurring for over eighteen months—in some cases over two years—are well-known to the men who handle the machines, and should be better known to the makers. When known and properly sifted, the manufacturers should be officially asked to heed the complaints. What is wanted, it seems to us, are experts who know the difficulties of the conditions to make periodic visits to the war zones and to confer with officers in charge of motor cyclist sections and repair bases—most of whom hold strong views—and then to return and advise manufacturers as to desirable changes or amendments in design. We believe this plan is adopted by the Royal Flying Corps in connection with aeroplane engines. A year ago we urged such a scheme of communication; later manufacturers' representatives visited the French front, but a solitary visit is not enough in the case of a motor vehicle. Besides, the weather and road conditions are so constantly changing.

It took many months of constant requisitioning before a suitably shaped handle-bar was standardised for our D.R.'s Overseas. The long touring bars often fitted led to many falls until riders themselves bent their bars to a suitable shape. We know an instance where hubs gave endless trouble for months and caused workshop mechanics much work, before the manufacturer even knew that this part required any attention. When *The Motor Cycle* drew his attention to the matter an improved design was produced.

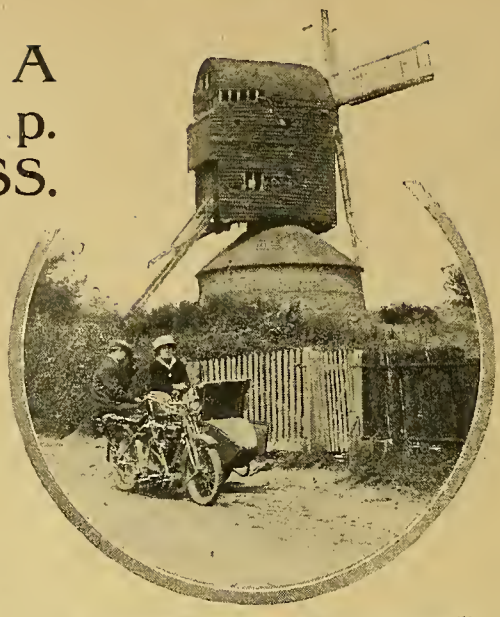
Another point in connection with military models is that different standards of finish are permitted; in one case machines are finished entirely in khaki, not a tiny plated part being permitted; in another instance the firm is allowed to deliver its standard products, all the parts being plated in the manner they would be for display in an agent's window: in still another instance the machines are all black. Now assuming that the question of colour finish is of minor importance—and we are not so convinced of that, seeing that motor cycles in war service have continually to be left exposed to the weather all night, and also must perforce be ready for use in all weathers, thus calling for the closest study in finishing processes to ward off rust and damp—some standard should surely be set by the authorities; either plating is of advantage or it is not of advantage. Personally, we should have imagined that in the summer months plated parts glinting in the sun would be of some guide to the enemy. We have heard it argued that rust is much less likely to attack parts of a machines which have been plated and subsequently neglected, and we are open to accept this view, but from the few remarks which we have made and which we could continue if it were necessary further to illustrate our point, it is clear that there is still some confusion in the production of the different patterns of war motor cycles.

An index to the advertisements in this issue will be found on the page facing the back cover.

A RUN ON A 1916 7-9 h.p. MATCHLESS.

A SHORT TRIP ON A POWERFUL AND COMFORTABLE MACHINE.

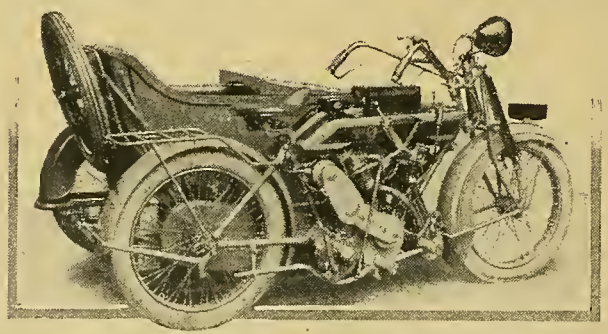
THIS machine was no manufacturer's specially tuned demonstration model, but a hard-worked hack belonging to a friend, which had had a season's wear. It was a fine autumn day, and as our course lay in the teeth of a south-westerly gale the engine was hard put to it for forty miles, but behaved splendidly. It would have done better had not the clutch been over-lubricated: this was caused by the relief pipe from the crank case throwing too much oil on to the chains and clutch—a fault which could have been easily remedied by closing the pipe a little. Despite this slight inconvenience the machine travelled extremely well and good time was made.



The Matchless halts beside an old windmill. These picturesque landmarks are rapidly falling into disuse, and the little country miller may in a few years cease to be.

Some Facts about the Engine.

The M.A.G. engine with which this outfit is equipped deserves the highest praise. It was not extraordinarily fast, but was a good puller, capable of a high average speed without making the slightest fuss, and totally devoid of all clatter and valve noises which are far too prevalent in many motor cycle engines. At 20 m.p.h. it was inaudible, and at higher speeds practically so, while the exhaust was quiet, though in no way throttled unduly. In short, the machine was one which a considerate driver would rejoice to use. Few people know how to remove the inlet valves of an M.A.G. engine. After the inlet dome has been removed the valve. if the motor has been run a long time since last taken down, will be found so firmly fixed as to be apparently immovable. If an attempt be made to lever the valve complete out of its seating the cage will probably be irremediably damaged. The process of removal is simplicity itself when once the procedure has been explained. Having taken away the exhaust spring the stem of the exhaust valve should be lifted until the head is found to be touching the inlet; next a nut or anything which will form a suitable distance-piece should be inserted between the bottom of the exhaust valve stem and the tappet, and the engine should be rotated, when the exhaust valve will push the inlet out.



A 1916 Matchless combination equipped with electric lighting set and interchangeable spare wheel. The engine is a 7 h.p. M.A.G

The particular engine referred to is fed with gas by an ordinary two - lever Amac carburetter, which is absolutely and entirely automatic. The air lever is permanently closed and is only moved to stop the engine. Occasionally, on very warm days, the engine can be persuaded to take a little air when travelling fast, but this is a very rare occurrence. This setting of the carburetter has been brought about by two factors—the fitting of the smallest jet the engine would take, and the extraordinary accuracy of the workmanship of the engine generally, which renders all joints perfectly gas and airtight. Of course, nowadays many two-lever carburetters are, to all intents and purposes, automatic in action, but the air lever is kept open instead of closed as in the instance mentioned above.

Mechanical Details.

To return to the machine in general; the change-speed was excellent and the clutch sweet in action, but the method of the control of the latter would have been better appreciated had the actuation been by a simple pedal similar to that working the brake and placed on the opposite footrest to that on which the brake control is situated. The other criticism is touching the handle-bars, which in the writer's opinion might be a trifle wider. Notwithstanding this fact the combination steered remarkably well, and even in unaccustomed hands proved a real pleasure to drive in traffic on account of the controllability of the engine and the excellence of the brakes.

The sidecar, the wheel of which is sprung, was luxuriously comfortable, and altogether the machine is one calculated to satisfy the most critical expert. Our return journey was made with the gale in our favour. Despite the fact that good time was made on the open stretches of road the throttle was only opened on hills. In the meantime, however, the new Matchless flat twin claims first attention, and when the factory of Messrs. Collier and Sons at Plumstead resumes its normal state the Matchless sidecar promises to become increasingly popular.

OCCASIONAL COMMENTS

BY 'IXION'

Acceleration.

I HAVE never—short of a big racing car—tasted such fiendish acceleration as a well-tuned four-cylinder motor cycle affords; it must be sampled to be believed. The response to the throttle is simply terrific, and the machine positively leaps away. By comparison the flat twin is certainly sluggish, unless it is geared rather low, or unless full advantage is taken of the gear box in snatching a jump. I do not think the flat twin is inferior to the vertical single in this respect, though some people say it is. At any rate, there are two features of value in acceleration—the first is its rate, the second is its smoothness. The four-cylinder has both. It gathers speed at immense velocity in a given distance, and it does so without rousing any sensation of effort. The flat twin accelerates less rapidly (at any rate, on equivalent gear ratios), but with almost equal smoothness. The vertical single accelerates less rapidly than a four-cylinder, and at about the same rate as the flat twin; but it labours very perceptibly under the process by comparison with the four and the twin alike; there is a sensation of hammering. In such comparisons it must be remembered that the 500 c.c. flat twin is a suckling compared to the four-cylinder or the vertical single; comparatively few designers have tackled this type of engine, and those who have can only claim a short acquaintance with its possibilities. I incline to believe that the flexibility, acceleration, and gear-accepting qualities of the larger flat twins will improve rapidly during the first few years after the war.

The Perfect Two-stroke Plug.

I AM still looking for a satisfactory sparking plug for the more exacting baby two-stroke engines. There are some engines which are not fastidious, though I am not good enough technician to know whether the cooler engines tolerate ordinary plugs chiefly by reason of low compression ratios or a port design which ensures good scavenging. For example, my baby Levis engine (to name one make) will work on almost any sort of plug; but I have owned others which rapidly overheat all ordinary plugs. The special Sphinx two-stroke plug is easily the best I have tried, but it will "incandesce" on a two-speeded baby up a long hill. The addition of the Fletcher cooling radiators enables it to resist the hottest baby engine I know; but you cannot use the Fletcher lower radiator (*i.e.*, that which replaces the ordinary s.p. washer and cools the butt of the plug and the outer electrode) unless a tube spanner is applicable, as the dished copper radiators prevent any other spanner from getting a grip. So I am still without a plug suitable for the hotter type, and equipped with a plug mounted vertically and centrally on the cylinder head; because there is no clearance to use a tube spanner and mount the auxiliary coolers on the Sphinx plug. I met a man using a Lodge racing plug on such an engine, which is foolish. All baby two-strokes are naturally somewhat oily engines, and the Lodge racer, being designed to keep its points very cool, cannot burn oil off itself. The crux of designing a two-stroke plug lies in the fact that the electrodes must keep cool, and yet must not accumulate carbon.

Carrier Bags.

NOT long ago I appealed to the trade for a carrier case constructed on matchbox lines, and with its contents accessible by opening a single lock at the end. Messrs. J. B. Brooks and Co., whose experience is, of course, unrivalled, tell me that they used to make such a case, but that it did not sell. They further find that motor cyclists will not buy bags which depend purely upon a lock, but insist on having straps as well. Evidently I am not the only rider who (*a*) has left his key-ring at home, and gouged an expensive leather case open with a cold chisel, and (*b*) paid good money for a locked carrier case, and had the lock choke up with dust after a few touring trips. I was rather interested in the catalogue which accompanied the firm's letter. They make first-class little cases for any and every accessory; and they further list ingenious full and half leggings, attached over the trousers by spring clips, which are just the thing for doubtful weather, when one does not need waders or oilies.

"Some" Pluck.

A PARAGRAPH on an unusual subject for this paper. Who is the bravest living Englishman? No, no, no; spare me these war yarns. They show courage of a type, I admit; courage in comradeship, where thousands face a speedy death side by side; courage when the blood is up, and danger has shrunk to a commonplace. The courage I shall now retail is of a higher, sterner sort—courage in solitude, the manful facing of a lonely death in cold, deliberate blood. It is my often unhappy lot to test various contraptions forwarded to the office by inventors, some of them sane, others—! Last week I opened a bulky parcel addressed to "Ixion," and carefully unfolded a most imposing looking waterproof, built of most admirable cloth. It was obviously large, and as it unfolded, it seemed a trifle shapeless. The staff were called in to collaborate. At last the design was solved. It had a round hole, with rain-turning collar, through which one thrust one's head, poncho-wise; it covered not only one's person, but one's machine, and was attached thereto by numerous little straps and tapes and ribbons. It happened to be raining at the time, and the staff gleefully hauled me into the yard, perched me on my saddle, stuck my head through the hole, and strapped the abomination firmly down. I was as helpless as a trussed fowl. I could not think of anybody who would release me but my faithful wife, resident many miles away; so I manfully operated my kick-starter and rode home.

A DOUGLAS IN THE DESERT

Despatch Carrying in the Desert of Sinai

LITTLE did the section think when they were carrying out their training in England that their destination on active service would be the deserts of Sinai. Like most D.R.'s in training, we had pictured to ourselves the mud fields of Flanders as the scene of our operations. Our training, too, at Biggleswade and Houghton Regis certainly seemed to justify the belief that we were bound for France, for there we plunged recklessly through water splashes, pushed and coaxed our bicycles through ploughed fields, invented patent mud-scrapers to prevent our mudguards clogging, and experimented with various devices for the protection of the front plug during deluges of rain. All apparently wasted, however. A signal company was required to accompany a certain division to the Sinai Peninsula, and we were the lucky D.R.'s chosen to support that signal company.

Our Destination.

Our arrival at the scene of operations was extremely depressing. The previous night we had entrained at a place some 150 miles away. The entraining process started at 7 p.m. and finished at 2 a.m. the next day. It is by no means child's play to get a signal company on to an Eastern train. First of all the mules have to be reckoned with. They seem to have a firmly-rooted objection to being led anywhere, and in particular they detest being packed ten deep in a cattle truck. So they kicked and reared and plunged, scattering confusion and disaster wherever they went. Having had previous experience of mules, we very wisely removed our "Dugs" to a far-distant corner of the yard and mounted guard over them. Eventually every mule was aboard, and kicking with might and main at the sides of the truck. Then cable carts, ration carts, tents, and baggage had to be manœuvred into the train, and, finally, the men squeezed into the remaining corners. We had two large trucks reserved for us and our bicycles, and with their usual pride of race the D.R.'s rode up in perfect order and were on board in fifteen minutes. Then followed a sleepless night's ride, which was relieved by some of the boys trying to ride their bicycles round the narrow compass of the truck. I believe some of them could and would ride along a telegraph wire if no other road were available.

Eventually we stopped—a longer stop than any of the preceding ones—at a place apparently in mid-desert. Astonishment could be read on every face. Was this the place we were destined for, this inhospitable waste of sand and scrub? Did they expect us to ride motor cycles over ground previously traversed only by camels. Many were the groans and curses uttered until someone suggested an alternative to motor cycles—mules. The one word was enough. Unanimously we decided that if it were humanly possible we would ride motor cycles over that desert.

The next morning we started work. Our signal office was a combination of dug-out and sand bag shelter, and we lined our Douglases up some 200 yards away in a neighbouring hollow, and screened them as far as possible from the prying eyes of aviators. Previous to going on duty we had scouted round and found a fairly hard camel track that seemed to link up, more or less, the various units of the division, but to reach this "road" we had to cross a belt of particularly loose sand, which was punctured here and there by pot-holes filled to the level of the surrounding ground with drifted sand. We had not long to wait for the first despatch. We gathered round to see what sort of a show No. 1 on the roster would put up. With a roar of the open exhaust the little Douglas went off, but soon the back wheel was describing snake-like movements in the treacherous sand. But the rider was our best man and not easily unsaddled. Now swinging from side to side in the loose sand, now thrown a foot or so in the air as his front wheel struck a hidden piece of rock, he made his way out to the track, and was soon bounding from bump to bump in top gear. That morning nearly everyone of us bit the sand in turn. It was a common sight to look out across the desert and see one of our D.R.'s lying in the sand and grabbing at the exhaust lever to stop the roar of the engine, which was probably racing on full throttle. But experience brings proficiency, and within a week we were all expert sand riders.

Riding Over Sleepers.

So far all was going well with us. We were evidently certain of being able to deliver all messages within the divisional area. The crucial test came when we had to take "urgents" to the Army Corps. Now there is no pretence at a road between the Division and the Army Corps at present. The only means of communication is the single railway line. Could we use this as our "road"? was the question everyone asked. At

A Douglas in the Desert.—

first glance it seemed well nigh impossible. The rail led straight through the desert, and there was no path or track on either side. Further, the sleepers protruded from two to six inches from the bed of flints on which the rails were laid. Nevertheless we were determined to attempt it. The first man who attempted it got through by a superhuman effort, and returned with every muscle in his body quivering from the awful pounding he had received. He described the journey as a choice between bumping from sleeper to sleeper on the track and sticking fast in the loose drift sand by the side of the track. No wonder that after riding there and back, a distance of twenty-eight miles, he was completely exhausted. Still, determined not to be beaten, we surveyed the track and mapped it out. You could ride for a certain distance between the rails, then take to desert and strike well out, when you would find a fairly hard stretch of sand; return again to the rails farther up for about three miles, and then strike out again on the opposite side of the track. When within about four miles from the corps headquarters one came across a camel track and followed that till it developed into a hard road leading straight into the camp. The initial attempts were naturally hard on the machine as well as on the rider. The frames of two machines were broken close to the head, footrests were swept away by rocks and railway lines, tanks sprung mysterious leaks, and tyre burst wholesale, but, on the whole, the bicycles stood up to their most arduous test splendidly. Probably all the journeys could have been done quicker and with more comfort to ourselves with a higher powered bicycle fitted with kick starter and clutch, but as these were then unobtainable we had to make the best of our little Douglases.

Frequent Overhauls.

There is one very curious effect that active service has on a D.R. In England he cordially dislikes cleaning his bicycle, and only does very necessary repairs and overhauls. But on active service, when he knows that his own life and often that of hundreds of others depends on his efficiency, you will find him constantly overhauling, repairing, and cleaning. It is no exaggeration to say that the D.R.'s motor cycle receives equally as much care and attention on active service as do the horses and mules; and anyone who has been on active service will know that this is saying a great deal.

With regard to the life, I can only say that no one in our section regrets being sent here now. The food is extremely good, and we D.R.'s do ourselves very well after one of our number has been up to the Army Corps. He always returns with his pannier loaded with vegetables, tinned fruit, chocolate, and cigarettes. Generally these arrive in good condition, for experience has taught us how to pack the things up well.

In conclusion, I must not forget to pay a tribute to *The Motor Cycle*. Of all papers it is the most eagerly sought after, and I can honestly say it is read from cover to cover. We are especially interested in the Military Section and in the various articles which from time to time appear on recent developments in motor cycling. No one is more eager than the D.R.'s to return to dear old Blighty, but not

"Till the hurly-burly's done,
Till the battle's lost and won."

H. W. GILBERT (Cpl.)

The Use of a Shifting Spanner.

GOOD kit is very often spoilt by thoughtless or careless handling, and the brand of the beginner is generally to be found on the keys and spanners contained in his tool roll. The actual destruction of kit is not in itself a very serious matter, as tools easily can be replaced, but it may be taken as certain that if the tools indicate bad usage, the nuts, etc., throughout the machine will be found in the same worn and mishandled condition. A good shifting spanner, if properly used, should last for years, but a few weeks in the hands of a tyro will reduce it to a nerve-shattered and weak-jointed wreck.

One of the most frequent misuses of large size shifting spanners is in the application of the hammer. A shifting spanner should never be hammered except in cases of dire necessity, and then great care should be taken that the jaws are tightly gripping the nut, otherwise the stem of the spanner will become "sprung," so that it will refuse to work easily, while in all probability the nut will be ruined.

If a hammer *must* be used, the blows should be delivered to the handle of the spanner on the side opposite to the jaws—that is, with the bottom jaw of the spanner pointing in the direction the nut is intended to turn. If the spanner is placed wrong way on and hammered, a few blows will probably suffice to ruin it, and at no time should pressure be applied to a shifting spanner in the wrong direction.

Shifting spanners are not intended for the purpose of removing or tightening valve caps, which must always be hammered. A special key is provided with every machine for this purpose, and not only does the use of a spanner spoil the cap, which is made of soft metal, but the spanner itself suffers.

MOTOR CYCLES IN JAPAN.

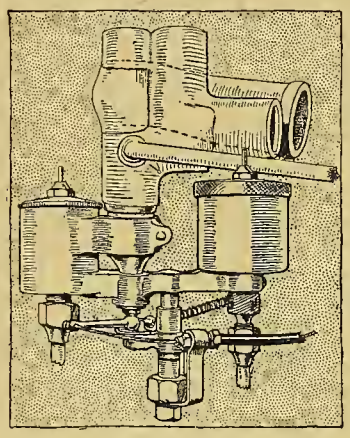
Riders of a B.S.A. and Premier crossing the Kurihashi ferry on the river Tamagawa. The photograph was sent to us by E. V Stevens, of Sagasni, Japan.

A PETROL-PARAFFIN CARBURETTER.

Device for utilising both fuels separately or mixed.

WE have recently received particulars of a conversion, which Mr. Willis of Wolverhampton has made to his Triumph carburetter, the idea of which forms the subject of a provisional patent.

In order to obtain the best running from petrol-paraffin mixtures, Mr. Willis devised the idea of fitting another float chamber to his Triumph carburetter, so



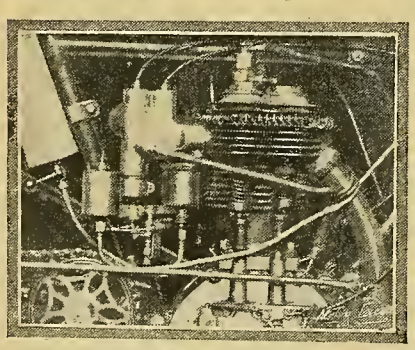
An ingenious manner of utilising paraffin as a fuel.

that either fuel might be used without the difficulty of having to drain the contents of the float chamber in order to start or run on pure petrol.

The second float chamber is so attached that a tap situated between the two float chambers controls the distribution of the fuels, either of which can be admitted to the jet at will, or, if so desired, only a portion of each fuel can be admitted.

When starting from cold the tap is turned so that only the chamber containing pure petrol from the small auxiliary tank is connected to the jet, but when the engine has warmed up, the petrol is gradually turned off, and little by little, the heavy fuel is turned on to the jet. If more power is required than can be obtained from the heavy fuel, then the tap is adjusted so that a proportion of pure petrol also enters the jet and mixes with the heavy fuel, so forming a more volatile mixture.

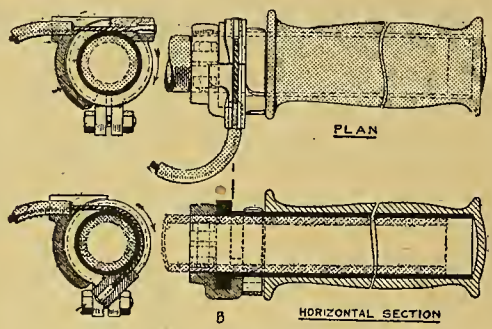
The heavy fuel feed pipe is arranged to pass round the exhaust pipe before entering the float chamber, while in order still further to facilitate the vaporisation of the heavy fuel, a pipe is taken from the exhaust and passes through the spray chamber of the carburetter just above the jet.



A petrol-paraffin carburetter fitted to F. H. Willis's Triumph. A separate float chamber is used for the two fuels.

A TWISTING HANDLE CONTROL.

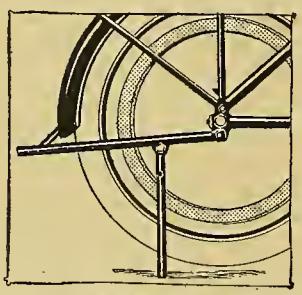
A TWISTING handle grip of extreme simplicity has been patented by Mr. S. Sadler, of 26, Claremont Rd., Sparkbrook, Birmingham. The revolving handle carries a boss to which is anchored a Bowden cable, a stop for the



outer casing being fixed to the handle-bar. The wire then leaves the handle-bar at right angles, but can be carried in any direction required. The rotating part is provided with a flange which, running in a groove, prevents the grip from sliding off the handle-bar.

A "JACK" STAND FOR MOTOR CYCLES

A NEAT and compact form of "jack" stand for a motor cycle is shown in the illustration herewith. It will be seen that the main part of the stand is of the conventional type, with secondary members that drop down when the machine is to be raised on its stand.

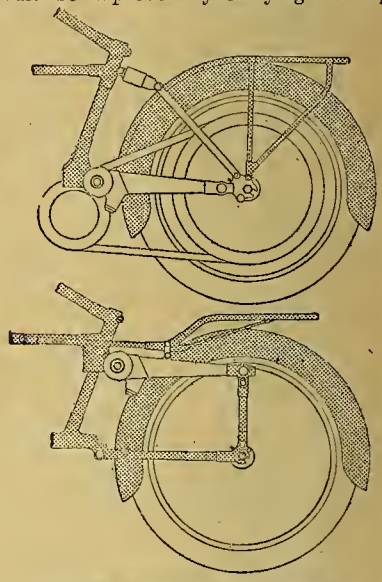


A "jack" stand for motor cycles, which enables the machine to be raised on the stand with the minimum of effort.

Foot pressure is then applied on the stand proper, which acts as a lever and lifts the rear wheel from the ground. A slight backward pull on the machine then swings the stand in the ordinary position. This is accomplished while the rider is standing alongside his machine holding it erect.

ENCLOSED SELF-LUBRICATING LEAF SPRINGS.

FOLLOWING upon our description in *The Motor Cycle* of December 14th of a motor cycle spring frame having the rear springs enclosed, a motor cyclist, Mr. Ernest Moor, of Gravesend, who has been a reader of this journal since his school days, sends us a design for enclosed and self-lubricating leaf springs. This design has much to recommend it, and is very neat in outward appearance. Two forms of springing are illustrated, but we suggest that the lower design would be improved by carrying the sup-



Showing various designs of encased rear springs.

ports from the spring to the axle in a loop over the wheel, and so increase the lateral rigidity. The lubrication is carried out by means of a plunger pump operated automatically by the rise and fall of the machine when running. In the upper design the leaf springs are supplemented by an enclosed coil spring below the saddle. The carrier is unsprung in the upper design, and partially sprung in the lower.

A ROTARY VAPORISER.

WE illustrate herewith a rotary vaporiser, the invention of one of our readers—Mr. A. E. Sampson, of Penketh. The device is automatically actuated by the movement of the incoming gases. This sets the rotor working

A vaporiser intended for existing machines patented by A. E. Sampson.

at high speed, and very thoroughly combines the air and petrol passing through the induction pipe. No heating of the pipe is said to be necessary, even when heavy fuels are used.

THE CASE FOR THE LONG STROKE

By JAMES L. NORTON A.M.I.A.E.

EXHAUSTIVE consideration of the subject of long *v.* short stroke engines cannot well be entered into in this journal, the subject being a complex and intricate one with many side issues, which I shall, as far as possible, avoid where the root of the argument is not affected. Before dealing with the several arguments of "A.A.S." under "Bearing Pressures," issue of October 19th, permit me to call attention to features in the article which give one the impression it was a biased and unfair attack upon the long stroke engine, rather than a true endeavour to determine the respective merits of either type. In the first place, "A.A.S." compares the reciprocating weights of two engines of dissimilar size, the long stroke capacity being roughly 8½% greater than the medium stroke; the fact that piston weight increases more rapidly than in direct proportion to an increase in size, and its effect upon inertia stresses are ignored, and this renders his figures in this connection of little true value.

The subject of bore-stroke ratio is a controversial one. Ever since the earliest days of motoring the subject of long *v.* short strokes has occupied the close attention of engine designers. An article on "Bearing Pressures," which appeared in "The Motor Cycle" for October 19th last, was, perhaps naturally, interpreted as being unjust to the long stroke engine by Mr. James L. Norton, A.M.I.A.E., than whom no greater exponent of the long stroke engine exists. His contribution to the subject is appended.—ED.

Comparative pressures may only be fairly considered in conjunction with equal power development.

Further, where "A.A.S." imagines he has an effective counter—referring to crank pins—he admits "the pressure is momentarily greater for a medium stroke engine," but later, in order to score a point, he says, "allowing *equal* gudgeon pin pressures," so altering his conditions in order to arrive at desired conclusions. (In your issue of December 7th his arguments are again similarly misleading, the figures showing a greater total piston pressure for the short stroke, where he can apparently afford to admit the fact, but, later—*re* gudgeon pin—he says, "As we may assume the pressures are equal in either case, etc.") Charity compels one to try and believe such misleading statements are inadvertent.

Yet once more must I draw attention to an assumption at once misleading and unfair, and then turn to the more congenial matter of dealing with the arguments proper, or, I greatly fear, my readers will accuse me of becoming vituperative, which I wish most earnestly to avoid becoming.

Both the reciprocating and revolving masses of the medium stroke engine which require balancing are greater than those of the other type, and yet "A.A.S." assumes both to be the same amount, *i.e.*, 4 ozs., out of balance, instead of basing his figures upon the fair assumption that the unbalanced mass is the same percentage of the total mass in either case, there being nothing to prevent both engines being balanced to the same degree of accuracy.

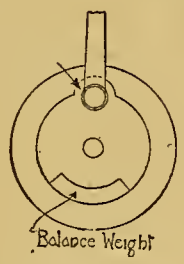
Failing this, his conclusions are of no effect.

Bearing Sizes.

"A.A.S." states: "The bearings can be larger for a medium stroke big bore engine than for a long stroke small bore engine, other conditions as specified being equal."

In this connection special attention is given to the crank pin with a drawing intended to prove that, owing to the proximity of the flywheel rim, a large bearing cannot be used. This, as pointed out by other writers, is a fallacy. If desired, a recess may be put in the rim as fig. 1 to permit of an exaggerated crank pin, not only without detriment, but with slight advantage to balancing. This, in fact, is the usual procedure.

There is, therefore, nothing to prevent the crank pin bearing of the long stroke being as large as desirable, but, whatever size be used, a still larger bearing is compulsory in the shorter stroke to obtain the same resistance to wear, as will be seen later. Incidentally, the usual type of crank pin bearing and the main shaft of a truly *short* stroke motor cycle engine are in such close proximity that comparatively small dimensions *are compulsory*. It is obvious that the big bore will admit a longer small end bearing than the long stroke engine, but this advantage is quite eclipsed by the greater pressure per square inch it has to support. Given that one-half the total length of either gudgeon pin is supported by the piston bosses, and that the total length is roughly equal to the bore (neglecting clearance), we have in the short stroke a bearing 1¾in. long against 1⅝in. in the long stroke, both of ⅝in. diameter.



The usual provision for crank pin in flywheel rim of a long stroke engine, which makes a smaller bobweight possible.

Now let us see what approximate explosion pressure per square inch of projected area each bearing is subjected to, allowing a maximum load of 250 lb. per square inch of piston head in both cases, this pressure being fairly well within the mark.

Long stroke, bore 82 mm. $\pi r^2 \times 250 =$ 2,046.4 lb. on piston head = 2,014.9 lb. per square inch of projected area of gudgeon pin bearing.

Short stroke, bore 88 mm. $\pi r^2 \times 250 =$ 2,356.9 lb. on piston head = 2,154.8 lb. per square inch of projected area of gudgeon pin bearing.

The Case for the Long Stroke.—

For brevity's sake I have omitted showing the entire calculation. It will be seen that the short stroke bearing has an additional load of approximately 140 lb. per square inch; it is therefore in effect much smaller, and will require rebushing more frequently than the long stroke engine, with its smaller total load and pressure per unit of bearing area.

"A.A.S." states: "Although the pressure is momentarily greater for a medium stroke engine, its greater bearing area helps to equalise matters."

It is shown that the assumed greater crank pin possibility of the big bore engine does not exist, and as the greater pressure on its bearing is admitted—this must be approximately 20% greater in order to yield the same power per revolution—the disadvantage in this connection is all with the shorter stroke.

"But the long stroke suffers wear for a greater distance of its bearing travel," "A.A.S." continues. If the *smaller* pressures of the long stroke are distributed over a greater distance, then surely the long stroke has a double advantage.

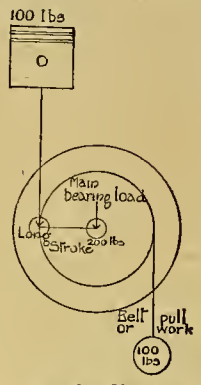


Fig. 2.—Showing load on long stroke main bearing for 100 lb. pull.

"A.A.S." further states: "On the main shaft bearings the wear will be equal so far as explosion pressures are concerned, as the total power transmitted will be equal." This assertion is entirely wrong. We will, for the moment, assume an impossibility, *i.e.*, that the total power transmitted by one stroke of the long stroke engine can be equalled by one of the shorter stroke, both having the same gear. With a force or pressure of, say, for example's sake, 100 lb. on the crank pin of the long stroke engine, and assuming, for simplicity's sake, there is no loss in transmission, so that the amount of work equals the power or pressure, and the effective pulley diameter is equal to the stroke length (ignoring the angle of belt pull which will not affect the issue), we have the following. See fig. 2. Here we see that the load sustained by the long stroke bearing is the total of pressure 100 lb. + 100 lb. load = 200 lb.

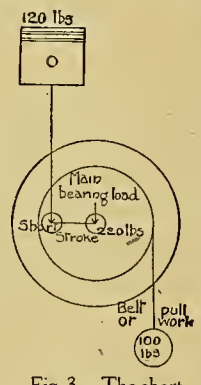


Fig. 3.—The short stroke requires a greater piston pressure to do the same work as a long stroke, with consequently greater bearing pressure.

Now turn to fig. 3, in which the shorter stroke engine, with its 20% shorter crank or lever, is shown doing the same work, it will be seen a 20% increase of pressure or power is necessary in order to balance the levers (see "A.A.S.," *The Motor Cycle*, November 16th.) Pressure 120 lb. + 100 lb. = 220 lb. load on main bearing, or 10% greater than that on the long stroke bearing. *If this were not so the short stroke engine would do only 80% of the work of the long stroke.*

It is stated the "peculiarity of the long stroke engine of hanging on under load, at low speeds especially, is not a help to long life for the bearings by any means."

This perhaps inadvertent admission that the long stroke engine has the peculiarity, *i.e.*, advantage, of *maintaining* a greater power output, and the statement that such does not help the bearings, almost tempt one to reply in sarcastic vein, apparently the short stroke owes its alleged longer bearing life to its comparative inefficiency and lack of power.

Cylinder Lubrication Difficulty.

On this question it need only be said that for the long stroke such difficulty does not exist, that a greater proportion of the area of cylinder wall is permanently shielded from the oil spray by the piston of the short stroke engine, and that not only does the smaller piston of the long stroke leave a greater length of cylinder exposed to the oil, but the lower portion of the piston itself may be, and usually is, subjected to a direct oil spray from the flywheels, this, too, on the side taking the load. This oil is carried up the cylinder walls to a point higher than the lowest position of the piston rings, which descend into a flood of fresh oil, and are thus directly and copiously lubricated every stroke. This very distinct and valuable advantage is denied the *short* stroke engine. as instance results at Brooklands.

Lubrication of Big End.

This bearing, when depending upon splash, is, perhaps, more precariously situated than any other one in the engine. The short stroke bearing, revolving as it does in that portion of the crank case most void of oil, is again at a disadvantage, whereas the path of the long stroke big end is where the oil spray is almost at its maximum density, and where the friction of the crank case walls, tending to retard its speed, possibly causes a slight pressure of oil—due to inertia—upon the bearing.

Cylinder Wear and Piston Ring Pressures.

Here we have possibly the greatest frictional loss in an engine. "A.A.S." omitted referring to this important feature in his article, and dismisses it with slight consideration in his letter of December 7th, but one has only to examine a cylinder after use to realise that the effects of piston pressure may almost be ignored when compared with the serious loss due to ring friction. The ridge in a cylinder, indicating the sudden increase of bore diameter due to wear, is not at the end of the path swept by the *piston*, but that swept by the piston *rings*. Unfortunately, piston ring pressure causes a dead loss; there is no return for it, as there is for piston pressure due to the increased angularity of the long stroke connecting rod, for, *whatever this pressure may be*, it is transmitted directly into turning effort on the crank pin. The wearing effects of this pressure need scarcely be considered, except upon two of the four strokes of the cycle, and very little upon one of these, *i.e.*, the compression stroke, whereas the piston ring loss is at a maximum over each of the four strokes.

Static friction, or the friction of rest—far more serious per unit of pressure than that of motion—comes into effect at the end of each of the four strokes.

(Fit a piston with its rings into a cylinder and endeavour to reciprocate it; the serious effort to start

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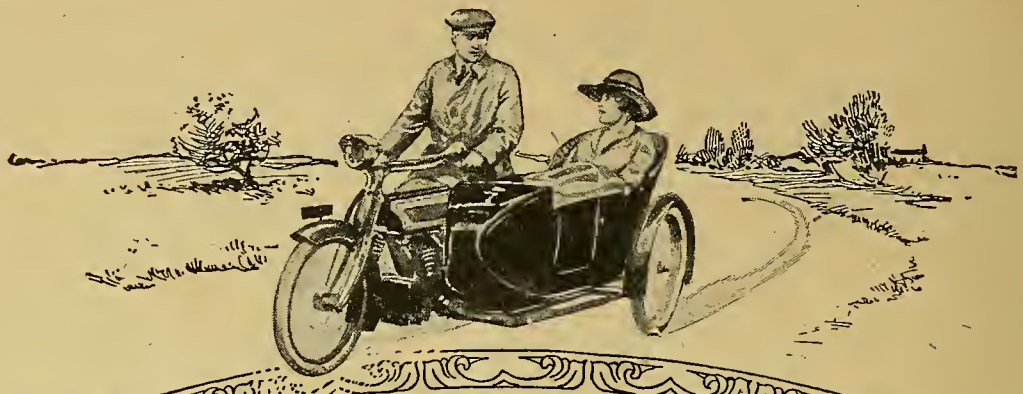

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The Case for the Long Stroke.—

it moving, compared with the effort of sliding it *after* starting, will be noted.) But, it will be said, both engines suffer from the same disadvantage. Quite so, but not nearly to the same extent; the difference being a serious debit to the short stroke, particularly if it be remembered that the short stroke rings are not so effectively lubricated as those of the long stroke.

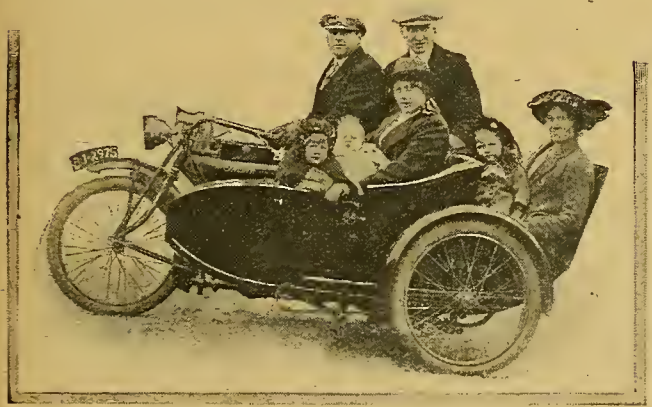
The pressure of rings may be found by formula, the pressure per inch being determined by the thickness and diameter of ring and the width of gap. It is natural to assume that the larger ring will be proportionately broader, thicker, and with a wider gap, but, in order to avoid unnecessary figures, we will suppose the short stroke ring to have the same pressure per square inch as its smaller rival, and will put this at the somewhat low figure of 5 lb. ("A.A.S." suggests 10 lb. to 15 lb.)

Long stroke ring 82 mm. $\times \frac{5}{32}$in. = area 1.58525 square inch $\times$ 5 lb. = 7.92625 lb. total pressure on cylinder walls.

Short stroke ring 88 mm. $\times \frac{3}{16}$in. = area 2.04182 square inch $\times$ 5 lb. = 10.20910 total pressure on cylinder walls.

Here in the most active power-consuming feature of the engine, which gets in its fell work every stroke regardless of throttle position or work required, be it little or much, running light or under load, the short stroke suffers an irredeemably increased loss of approximately 30%.

That portion of the article under the sub-heading "Centrifugal Pressures" appears to be a confusion of issues and misstatements, based upon erroneous assumptions and unfair comparisons (see introductory notes), and I shall not, therefore, attempt to deal with it in detail. As, however, it all centres around inertia stresses, I will as briefly as possible state the position of the two engines in this respect, commencing with a statement of the fact—which, I think, is never denied—that at higher than average revolutions, and under such conditions only, the long stroke connecting rod bearings may be subjected to higher mean inertia stresses than the short stroke at the same high revolutions, but—and here is the crux of the matter—*it is never necessary to run the long stroke at so high a speed as the short stroke to develop equal power*, or, in the case of a motor cycle, the same road speed. This fact, I think, is generally acknowledged, but it is not generally realised exactly what this means.



CAN THE LIGHT CAR EQUAL THIS?

One advantage seldom mentioned in discussions on sidecar *versus* light car. A 7-9 h.p. Indian Powerplus with double-seated sidecar owned by Mr. B. J. Haste, of Bramford, Ipswich.

SOME NUMBER PLATE.

A Belgian rider in one of the densely wooded avenues approaching the city of Antwerp. Prior to the war, motor cyclists in Belgium were obliged to carry number plates of ungainly size on their machines.

Every mechanical loss, *i.e.*, friction caused by explosion pressures and piston rings, unbalanced forces and inertia pumping efforts, valve operation, etc., is, with its attendant wear, multiplied in the short stroke engine owing to this necessity for higher revolutions. And here the importance of the V^2 factor and its effects with increase of speed upon the heavier reciprocating parts of the short stroke must not be overlooked. There are advantages in the use of a short stroke, but these in no way apply to the bearings, and consist in the possibilities of a lesser total weight, and, to the manufacturer, the fact that an extremely high standard of accuracy is not quite so essential as with long stroke engines.

I think we may safely deduce the following from our considerations:

The short stroke engine bearings are subjected to greater explosion pressure per unit of area, and, therefore, greater wear than the long stroke at equal revolutions.

At equal power output these pressures are still further increased in the short stroke engine, which may, in consequence, be expected to have, comparatively, a shorter life.

The short stroke engine bearings are subjected to greater inertia stresses than the long stroke at moderate speeds, but these stresses increase more rapidly in the long stroke with an increase of speed, and there is, therefore, a point at which they become greater than in the short stroke. There is some doubt if this critical point is often, if ever, reached, excepting in track machines, particularly when one remembers the increased revolution speed of the short stroke necessary to equal the greater power of the long stroke.

In conclusion, may I quote Mr. F. W. Lanchester in one of his papers before the I.A.E.? It will be remembered the Lanchester car was one of the last to abandon the use of the short stroke. "*Under all circumstances the short stroke is at some slight disadvantage on the score of mechanical efficiency.*"

TIMES TO LIGHT LAMPS.

GREENWICH TIME.

Jan. 11	...	...	4.42 p.m.
,, 13	...	...	4.44 ,,
,, 15	...	...	4.47 ,,
,, 17	...	...	4.50 ,,

A Government Appointment.

Mr. Percy Martin, the managing director of the B.S.A. and Daimler Co.'s, has received an important Government appointment, and will, we understand, represent the Ministry of Munitions on the Air Board.

Petrol for our Fighting Men.

Officers home on short leave will be glad to hear that they can obtain from the Petrol Control Committee, 19, Berkeley Street, London, W., licences for one or two months' supply of petrol, subject, of course, to the usual restrictions, *i.e.*, a motor cyclist can obtain either two or four gallons per month.

The Man Power Board.

We are pleased to learn that Mr. Eric N. Gamage, a director of Messrs. A. W. Gamage, Ltd., and eldest son of Mr. A. W. Gamage, has been appointed by Mr. Neville Chamberlain to take charge of the Suggestions Department of the above Board.

Another Name for the Tanks.

Is it true that among the Scots regiments the "Tanks" are known as "Uncanny Lorries"? *London Opinion* says that a reader from beyond the border has suggested the nickname at any rate.

Flat Twins of Moderate Capacity.

We have received from Mr. Granville E. Bradshaw some lengthy and conclusive comments upon the subject of flat twins, and the contention of a writer in a contemporary that "While the 350 c.c. opposed engine is singularly successful, engines of a larger capacity had yet to prove their success. *The development, and consequently the efficiency, were limited because obvious faults were inseparable from the design. . .*" As, however, we have already devoted a considerable amount of space to this topic we do not propose to continue the discussion at present, particularly as there can be no two opinions amongst engineers as to whether it is possible to make a really efficient flat twin of over 350 c.c. capacity, and *that*, neglecting side issues, is really the disputed point. This has been conclusively proved by "Ixion," Mr. Bradshaw, and other contributors to our pages.

A Petrol Query Settled.

The Petrol Control Committee tells us definitely that one may go on using personal petrol licences until all the petrol sanctioned by it has been purchased—this quite apart from whether or not one has taken all the spirit before the end of April (for a car licence) or March (for a motor cycle licence).

Prisoners to Mend Roads.

The Essex County Council has asked the War Office to arrange for the employment of German prisoners of war in repairing Essex main roads. All of the members of the surveyor's staff who are of military age have been released for road making behind the British lines in France, and ten steam rollers have been lent for the same purpose. For over two years such a course has been urged in various quarters.

Enriching the English Language.

The use of the term "flat twin" in preference to horizontally-opposed engine is merely a case of economy in words. Americans cannot agree whether to accept the term. Some time ago, Mr. E. B. Holton, a leading motor cyclist over the water, seized upon the term with enthusiasm, and said: "As it is good, I hope we adopt it into our own lingo. It is the English appellation for a doubly opposed motor. The beauty of it is that it fully describes the type, and at the same time is short."

A departmental manager of the Hendee Co. at first thought it was not bad, but that it would hardly do in the States, as it would quickly become confused with an American slang phrase. Be that as it may, journals throughout the world (including American journals) are following the lead of *The Motor Cycle*, and even if our American friends do not put their hall mark upon it, they will find that ere long it will become the accepted term among motor cyclists.

SPECIAL FEATURES:

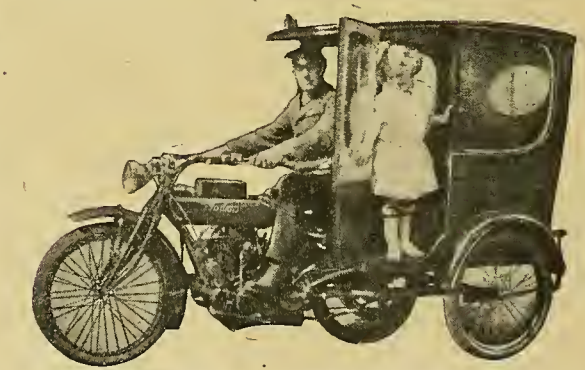
THE CASE FOR THE LONG STROKE.
A DOUGLAS IN THE DESERT.
A RUN ON A 1916 7.9 h.p. MATCHLESS.

Six Miles an Hour Speed Limit.

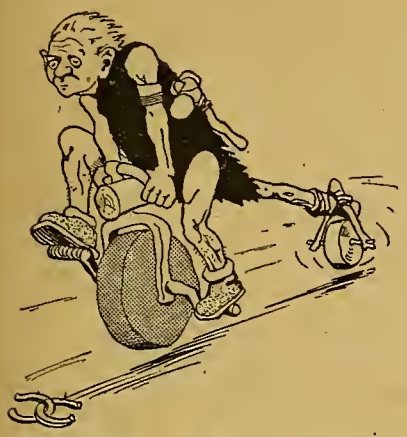
The Town Council of High Wycombe has carried a resolution stating that the speed limit of motor traffic should be reduced to six miles an hour after dark, and that an application be made to the Local Government Board for an Order fixing the speed limit as suggested. Alderman Ellis said that Wycombe traffic was a thousand times more dangerous than London, Councillor Elsom concurring. If that is the case, and we would not for a moment doubt the truth of the alarming statement, then six miles an hour certainly should be the maximum.

Motor Trades Debating Society.

A subject of extreme importance to those interested in the great labour problem will be discussed by the above society at the R.A.C. on the 17th inst., the resolution being "that restricted output is justified." Mr C. Latham will support the resolution, opposed by the vice-president, Mr. Powell. Arrangement can be made to attend the debate by communication with the hon. secretary, Mr. C. D. Clayton, 52, Shaftesbury Avenue, Piccadilly, W.



The limousine sidecar has made its appearance in America. It rejoices in the name of "rear car." The occupant is Miss Alice Neumann, a child actress. The vehicle is luxuriously upholstered in silk tapestry, and fitted with electric light.



HUMOUR FROM THE WAR ZONE.

A clever drawing of a pre-historic "despatch" rider (coloured in the original) was sent to us with seasonable greetings by the despatch riders of the XIII. Corps in France.

The National War Funds.

At the week-end the principal war funds stood as follow :

The Prince of Wales's Fund (distributed £3,529,719)	£6,021,270	0	0
British Red Cross Fund	5,830,036	0	0
Tobacco Fund	123,454	0	0

A Motor Cyclist's Enthusiasm.

Driver G. N. Bull writes from Egypt specially to refer us to the article which recently appeared in *The Motor Cycle* entitled from "Birmingham to the Isle of Wight," in which the author referred to the town of Brighstone as being pronounced Brigstone. Driver Bull tells us this is the old-fashioned way; it is now pronounced as it is spelt.

Light Cars for All Weathers.

Those interested in light and economical winter cars should buy a copy of next Wednesday's issue of *The Light Car*, which will be mainly devoted to the subject. Coupés of the limousine and cabriolet types will be dealt with in detail. *The Light Car* is an enterprising journal in a buff cover, issued from the offices of *The Motor Cycle* every Wednesday, one penny.

Expiration of Petrol Licences.

There has been a misunderstanding in the minds of some people respecting the validity of petrol licences after the end of April next. The Petrol Committee in a recent communication says that balance of petrol allotted but not purchased may be obtained any time after April. It is understood, of course, that not more than the maximum amount allotted to motor cyclists will be able to be purchased in any subsequent month.

Mr. Edge's New Appointment.

Mr. S. F. Edge, the well-known motorist, and a pioneer motor cyclist, who, since his retirement from business, has devoted his time to the study of agriculture, has been appointed Agricultural Machinery Controller. In the early days of the movement he was a generous patron of motor cycling, and even now takes a kindly interest in the pastime. He is a great believer in the lightweight.

An Illuminating Clause.

No lights are to be shown on stationary vehicles visible from the sea, yet no machines may be left stationary without lights in any place to which the public have access. The "dark" lamp would appear to offer the only solution.

From the "Birmingham Post."

"Wanted, motor bicycle, first-class only, 1916 B.S.A. or Triumph, only perfect one; £20 to £30.—Call ———." We refrain from giving full name and address, but if any reader is anxious to dispose of his 1916 Triumph or B.S.A. for that amount we will forward his letter.

The Ubiquitous Sidecar.

We notice the Imperial Tobacco Co., in a series of picture cards issued with cigarettes, speak of and illustrate the sidecar. "These handy motor cycles," the description goes, "with their sidecars, were quickly adopted by the military authorities as a very satisfactory means of rapid transit. All the allied armies are using these reliable and very efficient little machines, and large numbers of them are in constant use at the Front."

Flexible Rating.

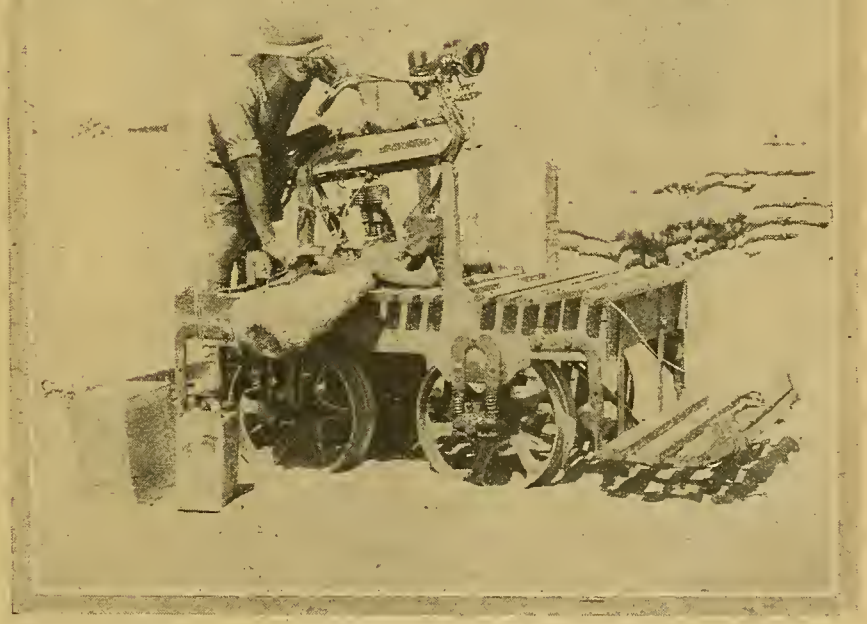
We have before us a private owner's advertisement from *The Motor Cycle* stating that he has a 17 h.p. Indian for sale. We do not aim at solving the question, but, judging from the latest rating of the big American twins (Harley-Davidson 16 h.p., Reading Standard 12 h.p.), he has probably heard the very latest news of the Indians *new* h.p., though we must acknowledge it has not yet reached us.

Army Motor Cycles.

The subject of recurring troubles with motor cycles in the Services is discussed, not for the first time, in our leading article this week.

The Human Body and the Motor Bicycle.

The other evening Professor Arthur Keith, M.D., F.R.C.S., opened a course of juvenile lectures at the Royal Institution. The first was entitled "The Human Machine, which All must Work." In the course of the lecture Professor Keith likened the 300 muscles of the human body to an engine, and said "that in some respects they are like the internal combustion engine of a motor bicycle; in other respects they are very unlike it." And with the aid of diagrams of both the motor bicycle and the human body he explained the resemblances and differences. "Muscles are slow combustion engines fitted with so perfect a radiatory system that they never become overheated." "Water," the lecturer went on to say, "has constantly to be applied to motor bicycle engines to keep them cool." Evidently the learned professor is more closely acquainted with muscles than motor bicycles. "Muscles are also furnished with sparking plugs—an ignition system—which rarely get out of order." The first motor bicycle engine had to do four strokes to get one effect. A pump was invented which did away with two of these strokes. "But millions and millions of years ago," Professor Keith said, "Nature saw the value of the pump for the human machine, and so she provided the heart." We are afraid that a motor cyclist would find this line of argument a little hard to follow.



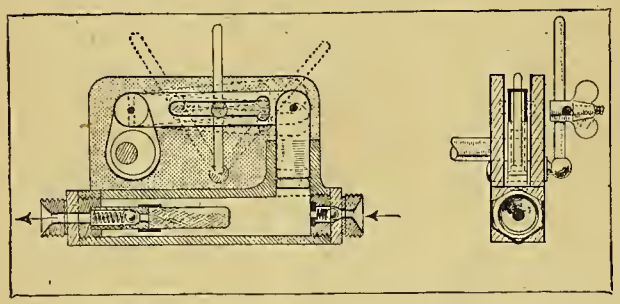
RAILWAY TROLLEY PROPELLED BY MOTOR CYCLE ENGINE.

The ingenuity of our fighting men at the various fronts is to be admired. The light railway trolley shown above in Western Egypt is propelled by a 4 h.p. Triumph motor cycle jury-rigged for the purpose. The turn of speed the trolley can attain is quite surprising. (*Passed by the Press Censor.*)

Throttle-controlled Lubrication.

A New Oil Pump combining Simplicity and Efficiency with a Minimum of Moving Parts.

IN the leader of our issue of December 21st last we again called attention to the extremely important subject of mechanical lubrication controlled in conjunction with the throttle, and we remarked that, "Though progress, so far as the ordinary riding public is concerned, may be comparatively slow, the fact remains that behind the scenes there is a good deal of experimental work quietly in progress." We had in mind several notable departures by well-known manufacturers, but we were



The Lamplugh throttle-controlled lubricator with cover removed, as fitted to a 3 h.p. Enfield for experimental purposes.

unaware of this, the latest throttle-controlled oil pump. It is the invention of Mr. J. S. Spittle, director and secretary of Messrs. S. A. Lamplugh, Ltd., of Tyseley, Birmingham, and is the outcome of several years' experimental work devoted to the question of perfect lubrication.

Positive Action.

Its principal feature is the positive up and down stroke of the plunger, obtained without the use of springs. A small gun-metal casting carries the whole mechanism; a flexible driving cable, driven from any suitable part of the engine unit, turns a worm and wheel; the shaft of the wheel carries a short crank, set eccentrically, so that a regular up and down motion is imparted. To the small end of the crank is pivoted one end of a lever, the other end being pivoted to the top of the pump plunger. This lever carries a movable stud, sliding in a slot in the lever, and operated by an outside rod. The Bowden throttle control cable is attached to this rod, so that the stroke of the pump is varied exactly as the throttle opening is varied. The range of stroke variation is from nil to $\frac{3}{16}$in., this being found sufficient for all types of motor cycle engines. The position of the cable attachment to the operating rod, whether high or low, can be adapted to give the best range of movement to suit a particular engine, and once set need not be altered.

The oil is passed straight through the body of the pump by means of inlet and outlet ball valves; a gauze filter is also provided. The plunger is solid metal with a cup leather head. A remarkable feature is that the whole pump is assembled without the use of nuts or screws, by means of a neat arrangement of slots in the casting. It can be taken down and reassembled very quickly without any special tools.

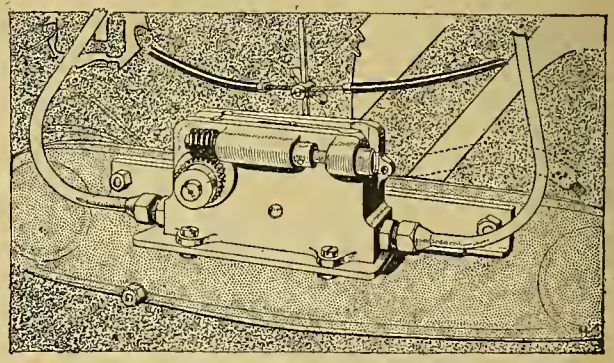
Easily Fitted.

The moving parts are enclosed by a detachable cover to exclude dirt. It will make no difference where it is fitted to the machine—the drive can be taken from any suitable point by flexible cable or other direct means, and once set to suit the engine the pump should need no further attention. There is practically nothing to get out of order, wear in its moving parts is negligible because it works very slowly, and if it is used in conjunction with a sight feed the action will be constantly evident to the rider.

Our illustration shows it, as fitted to a 3 h.p. Enfield twin for preliminary experiments; it was attached to the magneto chain cover and driven off the end of the magneto shaft. There is no doubt about its efficiency; with the engine running at half throttle or less, the sight feed was dripping regularly, and at full throttle the oil came through in big spurts practically amounting to a continuous stream.

Motor cycle manufacturers can be supplied with models for testing, and Messrs. Lamplugh will soon be in a position to undertake the manufacture in large quantities if required for Government purposes.

Its simplicity, positive action, easy fitting, and small cost should appeal to all, and we may predict, with confidence, that the time is not far off when all reputable machines will carry some such type of throttle-controlled lubricator as a standard fitting.



Section and end view of the Lamplugh pump. The dotted lines indicate the extreme movements of the control.

PROPOSED ASSOCIATION OF PRIVATE OWNERS.

AS it appeared desirable that a private owners' association should be formed, a small meeting was held recently to consider the question. A subscription of 10s. for car owners and 5s. for motor cyclists was suggested, and the meeting was adjourned until January 16th, when it will take place at 2.45 p.m. at the Bedford Head Hotel, Maiden Lane, Bedford Street, Strand. Admission will be by visiting card (name and full address), and a declaration must be signed that the visitor is in no way connected with the motor trade. Those intending to be present are requested to send a postcard to Maj. H. Vane Stow, secretary *pro tem.*, 353, Strand, London, W.C.

AVERAGE PRICES.

IN giving our usual list of second-hand prices we would draw the attention of our readers to the fact that these figures represent the approximate value of ordinary standard models. Machines with electric lighting equipment, etc., do not come under this heading, as, on the score of simplicity, the detailing of extra fittings cannot be included.

Make.	Year.	H.P.	Average for last week.	Latest weekly average obtainable.
A.J.S.	1916	6 combination	—	£95
„	1915	2¾ 3-speed	£40	—
„	1912	6 combination	£40	—
Allon	1916	2-stroke, 2-sp.	—	£30
Arie	1916	5 3-sp. sidecar	—	£80
„	1915	3½ T.T.	£33	—
Bat	1912-13	6 h.p. 3-speed	£32	—
„	1912-13	8 h.p. 2-speed	£39	—
B.S.A.	1916	4¼ 3-sp. chain	—	£58
„	1916	4¼ 3-sp. sidecar	—	£65
„	1915	4¼ T.T. clutch	—	£40
Calthorpe-Jap	1916	2¾ 2-speed	—	£30
„	1915	2¾ 2-speed	£23	—
Clyno	1913-14	6 h.p. comb.	£40	—
„	1912	6 combination	£36	—
Connaught	1914	2-speed, 2-stroke	£23	—
Douglas	1916	2¾ W.D.	£50	—
„	1916	4 3-sp. sidecar	£70	—
„	1915	W.D. 2-speed	£45	—
„	1914	2¾ 2-speed	£35	—
Enfield	1916	6 combination	£79	—
„	1916	3 2-speed	£46	—
„	1915	6 combination	—	£79
„	1914	6 combination	£58	—
Excelsior (A.)	1916	7 3-sp. sidecar	£70	—
F.N.	1914	2-speed	£28	—
H.-Davidson	1916	7-9 sidecar	£87	—
„	1915	7-9 sidecar	£65	—
Henderson	1915	sidecar	£67	—
Humber	1914	3½ 3-speed	£35	—
Indian	1916	Powerplus sidecar	—	£85
„	1915	7-9 3-sp. sidecar	£63	—
„	1915	7-9 R.R.	£40	—
„	1915	5 3-sp. sidecar	—	£58
James	1915	4½ 3-speed	£68	—
„	1914	4½ sidecar	£45	—
Matchless	1915	8 3-sp. sidecar	—	£65
„	1913	6 3-sp. sidecar	£30	—
New Hudson	1915	2-stroke	£21	—
„	1915	4 3-sp. sidecar	—	£54
New Imperial	1916	2½	£30	—
Norton	1916	3½ 3-speed	£48	—
P. & M.	1914	sidecar	£55	—
„	1913	3 speed	£40	—
Premier	1914	3½ sidecar	—	£42
Radco	1915	2-stroke	£18	—
Rover	1916	3½ T.T.	£56	—
„	1916	3½ 3-speed	£68	—
„	1915	3½ 3-speed	£38	—
Rudge	1915	5-6	£60	—
„	1915	3½ Multi sidecar	—	£45
Scott	1916	sidecar	—	£58
„	1915	2-speed	£46	—
Sunbeam	1916	8 sidecar	£100	—
„	1916	3½ 3-speed	£78	—
„	1915	3½ sidecar	£82	—
Triumph	1915	4 sidecar	£60	—
„	1914	4 sidecar	—	£45
„	1913	3½ sidecar	£37	—
Zenith	1916	8 sidecar	£80	—
„	1914	8 Gradua	£45	—
„	1914	6 Gradua	£42	—

EXPORTS AND IMPORTS.

THE chief point of interest the current figures bring to light is that the export of motor cycles for 1916 shows an increase of 1,924 over the figures of the preceding year, but during 1916 more spares and unassembled parts were sent abroad than during 1915.

As regards imports, since these have been prohibited since last March, it is not surprising that only five machines, presumably commercial vehicles, have found their way into this country during the past month.

IMPORTS.

	1914.	1915.	1916.
MONTH ENDED DECEMBER 31ST.			
Number of Machines	52	217	5
Value of Machines	£1,721	£9,660	£210
Value of all Parts, Accessories, Spares, etc.	£2,604	£13,372	£8,526
YEAR ENDED DECEMBER 31ST.			
Number of Machines	2,559	4,531	1,192
Value of Machines	£93,121	£205,817	£50,478
Value of all Parts, Accessories, Spares, etc.	£94,540	£157,506	£125,537

EXPORTS.

	1914.	1915.	1916.
MONTH ENDED DECEMBER 31ST.			
Number of Machines	1,101	1,065	691
Value of Machines	£52,435	£57,845	£32,674
Value of all Parts, Accessories, Spares, etc.	£21,595	£32,700	£22,290
YEAR ENDED DECEMBER 31ST.			
Number of Machines	20,877	10,927	12,851
Value of Machines	£988,473	£510,374	£565,067
Value of all Parts, Accessories, Spares, etc.	£346,777	£311,372	£364,485

PETROL IMPORTS.

The petrol imports for December, 1915, exceed those of December, 1916, by 8,882,524 gallons, the figures being:

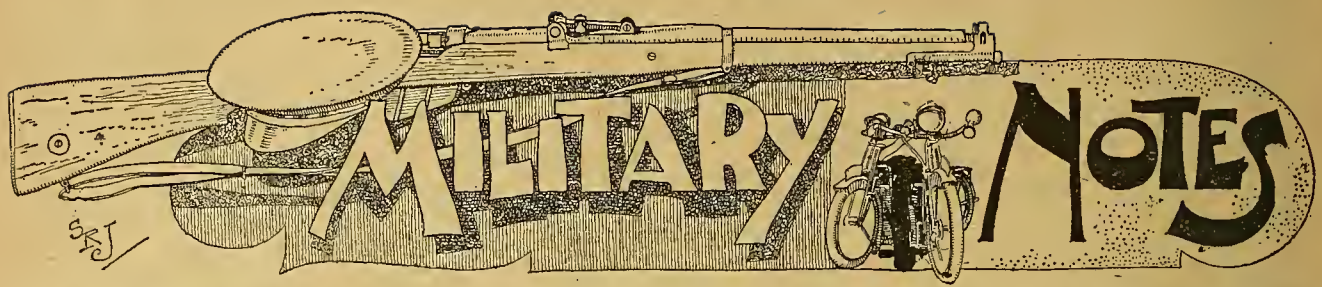
	Gallons.
December, 1915	12,983,382
„ 1916	4,100,858

Taking the whole year, however, the petrol imports are very much higher for 1916 than for 1915, the figures showing an increase of 17,239,875 gallons.

	Gallons.
Year ended 1915	144,574,891
„ „ 1916	161,814,766

THE AUTO-PED IN ENGLAND.

The Auto-ped has arrived, and its user was soon in trouble—not of the mechanical variety! Miss Shirley Kellogg, the revue actress, took her motor scooter for a spin and was hauled up for "causing an obstruction," so the daily papers say. Most likely, however, the absence of registration letters was the real offence, as the scooter is a motor cycle within the meaning of the Act.



THE CHAIRMAN OF THE AIR BOARD.

LORD COWDRAY, who has been appointed Chairman of the Air Board, is the father of the Hon. Geoffrey Pearson, who, when acting as a motor cycle despatch rider, was killed in France in 1914 during the retreat from Mons.

RACING MOTOR CYCLIST IN EGYPT.

WE have received the following interesting letter from Cpl. T. E. Greene, whom all will remember as the dashing Irish rider of Rudge motor cycles. It will be recollected that he is the holder of the Irish End-to-end record, and his daring riding in the T.T. races, in Spain, and other places will also be recalled. Greene is now serving with the A.S.C., M.T., in Egypt.

"I see so many letters and photographs reproduced in your valuable paper every week (as we even get it so far out as Egypt), that I thought I would take the liberty of writing a few lines myself. I am head motor cycle tester and finisher at the base repair depot for all Egypt, and I can tell you it is some job, too. We have to deal with all makes and dates of machines, and have not got the very best of roads for testing purposes. Alexandria itself is all that *pavé* stuff, not at all pleasant to ride on, and the natives seem to delight in walking in the roadway. We therefore have to do any testing outside the city itself, and there one finds most of the roads—if you can call them roads—in a terrible state, with about three to four inches of sand. The pot-holes, which are very deep, cannot be seen until close up, then one finds oneself nearly over the handle-bars owing to the crank case coming into contact with the ground. As a matter of fact, I have knocked several oil drain lugs out of the Triumph crank case owing to this, and the front stand clip of the Douglas being in the way, I always take the clip off now while testing. If the roads out here were anything like they are in England one could not ask for anything better than motor cycling, as the weather is the very best. There is no need to worry as to whether it will rain before you get back or not. We have been here now eight months, and have not had one night's rain in that time. How would that suit at home? All right for twenty-four hour runs, etc.? What?"

MOTOR MACHINE GUNNERS IN GERMAN EAST.

A MEMBER of a battery operating in British East Africa writes under date of November 7th last that the batteries are doing excellent service "out there," besides which there are a number of officers and N.C.O.'s from Bisley in the Gold Coast regiments. The writer, having recovered from malaria, was just in time to catch up his battery at Kondoa when Van Deventer moved to take the railway. This particular battery was the first unit to cross and cut the German central railway—another feather in the M.M.G.S. cap. A Douglas rider attached to the battery was the first to cross, two of the scouts, forgetting that they had been warned of mines, "scrapped" for the bridge, closely followed by armoured cars. At the time of writing, our informant was back at the workshops, having returned to have the back axle of one of the cars straightened. This is not the first axle which has required attention, he remarks, but never a motor cycle frame. The motor cyclists in German East Africa get any amount of rough riding, he adds with emphasis.

Cpl. T. E. Greene, A.S.C., M.T., E.E.F., testing repaired Douglas motor cycles on the rough ground in the neighbourhood of Alexandria. (See letter.)

FLIGHT-LT. GEORGE EDWARDS KILLED.

WE regret to record the death of Flight-Lt. George Edwards, who for some time was officially reported missing. He was associated with the motor cycling world for many years, and was one of the first to design a practical pillion-seat, a photograph of

which appeared in *The Motor Cycle* at the time of his attempt to place it on the market. After doing useful work as a despatch rider in Egypt, he joined the R.F.C., obtaining his wings after three months training.

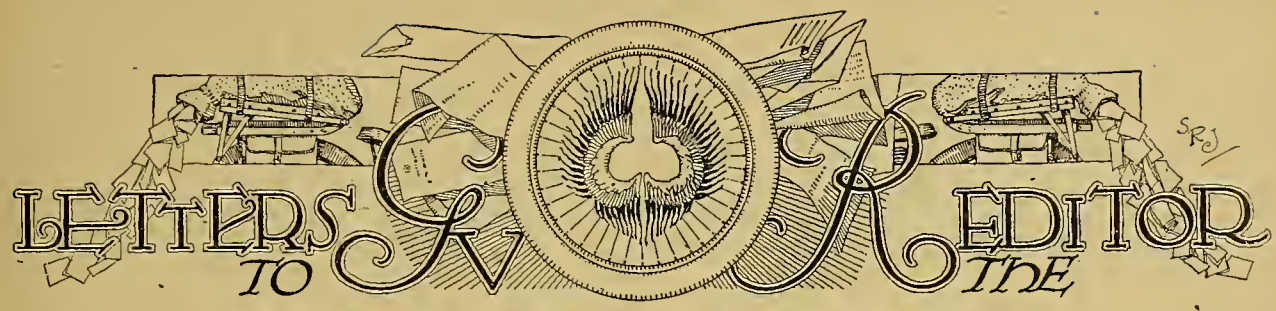
A FRENCHMAN'S APPRECIATION.

IT is not our usual practice to publish appreciations of *The Motor Cycle*, owing to lack of space, but we cannot refrain from repeating a quaint paragraph of appreciation received from an officer in the French Army:

"Your very marvellous paper *The Motor Cycle* is my sweet companion in the first line, and I read it with very great pleasure. I hope you will have a good 1917 year."

MENTIONED IN DESPATCHES.

AMONG the 3,040 names of those mentioned in despatches, we note those of Capt. A. E. Davidson, R.E., D.S.O., whom we announced as having recently been promoted to the rank of Major, motor cyclist Cpl. W. Bailey, artificer motor cyclist Cpl. J. Brand, and motor cyclist Cpl. W. J. Scarff. Temp-Lt. C. J. Cadman, R.E. (Special Reserve), who was a motor cyclist with the first Expeditionary Force, has been awarded the Military Cross.



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address

NORTON ENGINES.

Sir,—An absurd rumour is being spread by someone, which seems to be gaining ground, for it has reached us from many parts of the kingdom, and appears to have become fairly prevalent at the Front, that we are now using another make of engine than our own (the Norton) for our machines. May we through your columns most emphatically contradict this? *The Norton original long stroke engine, designed and made by ourselves, is the only power unit ever fitted to Norton motor cycles*, and we have no intention of fitting another make at any time.

NORTON MOTORS, LTD.

AN UNUSUAL TROUBLE.

Sir,—*Re* your paragraph (January 4th, page 11), I had the same thing happen last year. The machine was an American Excelsior, the fastest and most comfortable riding machine I have owned, and I have had forty-two. This was caused through a slight seizure at over 70 m.p.h. After the engine had cooled it was perfectly free, but after about another four hundred miles an oil leakage was noticeable, which I took to be the union on front cylinder oil feed. This went on for about six weeks, and then the cylinder came in two. The makers replaced this free of charge, however. C.E.T.

Bedford.

HOW TO CLEAN A CRANK CASE.

Sir,—Some weeks ago I saw a letter in *The Motor Cycle* from a correspondent who wished to clean his crank case and had used a strong solution of soda for the purpose.

Sodium in any form will discolour aluminium, and should not be used if the colour is to be kept good. Scrub well with a wire brush and paraffin, and then wash with a little petrol. You may then wash with a very little *soft* soap (which is not a sodium but a potassium soap), and paint over with a fairly strong solution of magnesium, such as ordinary liquid magnesia or sulphate of magnesia, commonly called Epsom salts, which will (or ought to) restore the brilliant white colour to the metal.

H. H. BROWNRIGG.

THE SCOTT SOCIABLE.

Sir,—I have for some few years been a very interested reader of *The Motor Cycle*, and would be very sorry to get out of touch with the movements of the motor cycling world, although I have never yet owned a motor cycle.

I think that Mr. Scott deserves a "pat on the back" for putting his invention before the public. His motives are clearly seen, viz., simplicity and economy. Many motor cyclists would not ride motor cycles if they could afford cars; hence the introduction of the sidecar. The sidecar has the advantage of being easily and quickly removed, but what about the driver in wet weather? The Scott Sociable, whilst being an unalterable two-seated machine, would be far and away more comfortable to at least the driver, if not the passenger, to say nothing about the protection from the elements.

Then, again, take the consumption and the tax, both of which would be about the same as any big twin combination. If the sociable were a trifle more extravagant, would not the extra comfort and protection over-balance its so-called ugly appearance?

I have no connection whatever with Mr. Scott, and, as far as I know, have never seen him, but I must express my gratitude to him (through your paper, if you will permit) for introducing such a handy, accessible, sensible, and economical machine as the Scott Sociable, and I may say that if all goes well, after the war, I shall see about purchasing one. HAROLD E. CARTWRIGHT.

WATER INJECTION IN A PETROL ENGINE.

Sir,—I note a letter on the above subject in *The Motor Cycle* of December 7th, signed "L.G. (R.N.)," stating that "the idea of introducing water into the cylinder of his engine was patented by Prof. Banco in Germany some years ago." As this statement is inclined to be considerably misleading, and also as the question of water injection appears to be considered something of a novelty, the following points may be of interest.

It may be said at once that the idea of water injection dates back to the earliest stages of the conception of the gas engine. Reference to "The Gas Engine Manual," by W. A. Tookey (a well-known writer on internal combustion practice), records the following instances of its use:

First, as far back as 1791, by John Barber, in an attempt to make a gas turbine; later in reciprocating gas engines by Samuel Brown, in 1823; by Hugon in 1865; and by Brayton in 1873; water being introduced partly, of course, for cooling purposes, but also for the purpose of attempting to combine the use of steam and gas expansion. Further than this, water injection has been considerably experimented with by gas engine makers in more recent times, particularly in attempts to obtain practical advantages from very high compression pressures.

The use of water injection also became quite common practice with oil engine manufacturers, compression being carried to a point where ignition became spontaneous, the actual timing of the ignition being carried out by water injection of varying amounts to suit the load prevailing; but latterly this practice has been dropped, a point of makers' advertisements being, "No water injection"! Evidently there is a fly in the ointment!

Water injection would appear to give numerous advantages, and actually does so; but, unfortunately, it brings attendant with it disadvantages that more than counteract any gains. The disadvantages follow, firstly, from the fact that water always contains impurities, which, when water is turned into steam, are left behind, forming a hard deposit on cylinders and valves, causing cutting of valve faces and endless trouble; secondly, most fuels contain a small percentage of sulphur, which, released on combustion of the fuel (my knowledge of chemistry is somewhat "rocky," but I believe this statement is *au fait*), combines with water vapours to form sulphuric acid, causing considerable corrosion to valves and exhaust connections. Perhaps some of your readers can give us valuable information on the chemical action taking place, and possibly also give us a chemical analysis of petrol and other motor fuels.

It will be seen, however, that the introduction of water into the cylinder of an internal combustion engine is attendant with difficulties which must be overcome before success is attained. Reference to periodicals and treatises on internal combustion engineering will often give much valuable information and save a good deal of "spade" work to motor cyclists who have the opportunity to experiment.

The principles involved in gas and oil engines are, of course, the same as in petrol engines, though proper consideration would need to be given to the different circumstances under which a motor cycle engine is required to work. W.M.

Workington.

SINGLE V. TWIN-CYLINDER ENGINES.

Sir,—I cannot let the two subjects at present under discussion, viz.; "Flat Twin *v.* Single" and "British Twin *v.* American Twin," slip past without saying anything. To those who contend that it is impossible to build a well-designed frame for the flat twin I reply that it is not only possible, but has been done. I admit, nevertheless, that some flat twins have not well designed frames. How a good flat twin engine can be expected to keep vertical in the frame, when it is only attached to lugs on the bottom tube, I do not know, and, in a good many machines of this type that I have seen, it has not remained upright, but has pulled itself over on the driving side. Another thing which puts me off the average flat twin is the ceaseless rattle, which seems to come mostly from the timing gear.

Sporting single every time for me, except for sidecar work!

Now for the Americans.

Have any of your pro-American correspondents tried to bore holes in the American radiating fins? They will find them to be made of stuff as brittle as glass. How many of these people, who say the American has the most silent timing gear, have ridden an A.J.S. "6"? This machine has quite the most silent timing gear on the road. Usual disclaimers in large quantities.

H. ST. V. ADDENBROOKE.

Sir,—Perhaps Mr. Granville Bradshaw and "R.E.C." will modify their views that a long induction pipe does not affect carburation. I refer them to "Ixion's" tale of horizontal woe on page 553 of your issue of December 28th, 1916. His "paradox" was merely overheating due to running on an unduly bad (probably very weak) mixture. The low temperature of his long induction pipe caused condensation of the petrol on the walls of the pipe, and the resultant mixture was not at all satisfactory for running on. When sufficient fluid petrol had run into his hot inlet port and was vaporised by the heat, the temporary enriching of the mixture gave him his momentary acceleration. Lagging the pipe proved to be the cure. Precisely! His experience (I admire his fairmindedness in publishing it) comes at a very awkward moment for those who are trying to persuade us that long exposed induction pipes are an advantage. My experience this winter with a horizonal twin is precisely the same as "Ixion's," and my carburetter is *exhaust jacketed*.

Finally, if an engine can indulge simultaneously in an overheated sparking plug and a refrigerator inlet pipe, what constitutes a "hot side"?

Further in answer to "R.E.C.," the paragraph on flat twins in my article of December 14th does not apply solely to the Douglas or to any other individual make, but applies to all the flat twins I know of.

If long exposed induction pipes do not mean bad carburation, then all the tendency of modern car engine design is wrong.

I have had as much trouble out of a horizontal twin in a month as I get out of a single in a year. I mention no names.

A. LINDSAY,
CAPT. R.A.M.C.

THE FLAT TWIN AT THE BAR.

Sir,—I have read Mr. de Lissa's comments on the A.B.C. and its designer, and I should like to say a word or two in reply.

Mr. Bradshaw's sketches in the previous issue are clearly his own engines, therefore I fail to see how Mr. de Lissa can accuse Mr. Bradshaw of criticising other people's designs.

Re the "hot top" and "hot side." Could there be anything much worse than an unequally expanding cylinder? And this is what a "hot side" generally means. Personally, I shall be pleased to see some of Mr. de Lissa's shading, and then we shall see where the abnormally "hot top" comes in. To my mind, the position of the A.B.C. exhaust port and valve is very good. The valve must be cooled by the incoming charge, also the position of the exhaust exit lends itself to efficient cooling. At any rate, it is not stuck on the cylinder side, which would again give us a "hot side."

Mr. de Lissa's remarks about plug electrodes do not apply to A.B.C. engines so far as my experience goes. I used one of these engines with overhead valves in the 1913 T.T. and the practice of the 1914 race; my only plug trouble was through over-oiling. I have, however, experienced on Brooklands (with a well-known side-by-side valve single) the plug drooping trouble, also plugs blowing out, cylinders warping, etc.

Mr. de Lissa speaks as though 5,000 engines is a tremendous number. It would be interesting to know how many engines the A.B.C. Co. have turned out (probably it would be censored). Regarding the "rude shocks," all I can say is "wait and see," but in the meantime do not forget the A.B.C. was the first machine (500 c.c.) to do over 80 m.p.h. I also wonder how much credit was given to Mr. G. E. Bradshaw for the performance of a well-known flat twin when it broke the kilometre and mile world's records in the 350 c.c. class, and how much he designed and made.

Naturally, Mr. de Lissa calls a clever designer a man who designs an engine like the M.A.G. I do not blame him. I, as an uninterested (financially) auto engineer, consider a man who can design a power unit like the A.B.C. not only a designer, but one who knows his job and understands metallurgy.

Mr. de Lissa cannot see why such a wonderful and powerful engine as the A.B.C. *is* should require a four-speed box, and mentions A.B.C.'s claim to 4 to 70 m.p.h. on top. Well, what an engine is capable of doing and what (in time) it would take out of the transmission, engine, and tyres, entitles a designer to give us a four or even a six-speed box, provided it is a properly designed gate change. Whilst on the subject of gear boxes, I should strongly advise several designers (both car and motor cycle) to examine an A.B.C. and try and find out how it is that a perfect change can be made under almost all conditions.

Probably Messrs. Rolls-Royce will tell Mr. de Lissa the necessity of their fitting a four-speed box to their splendidly balanced, vibrationless, six-cylinder engined car.

Yes, as your letter says, Mr. de Lissa, the A.B.C. engine is quite good—in fact, it is better designed than anything yet manufactured in the motor cycle world, and most certainly the best engineering job.

ALF. WRAY.

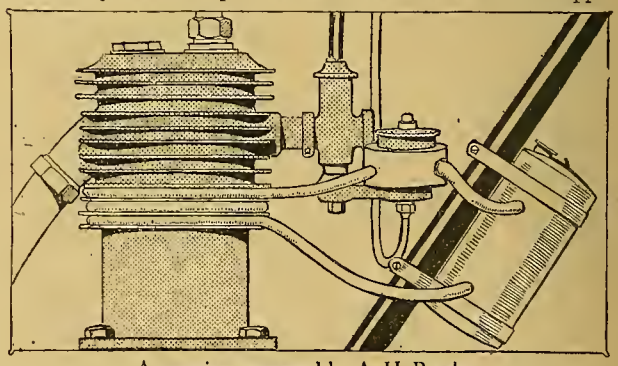
A CURIOUS CASE.

Sir,—In reply to "A Curious Case" sent by Cyclist H. J. Ives (2581), I may state I had similar trouble with a 2¼ h.p. New Hudson. What I found to be the trouble was the magneto cog had slipped back a little, and the ignition became too far retarded. I tried various settings of the magneto, and found I got the best results with the magneto giving the spark when the piston was threequarters of an inch from the top (on compression). The engine will now take all the air I can give it, climb all hills on top, and never blows back.

T.C.
Falkirk.

ANOTHER SUGGESTED VAPORISER.

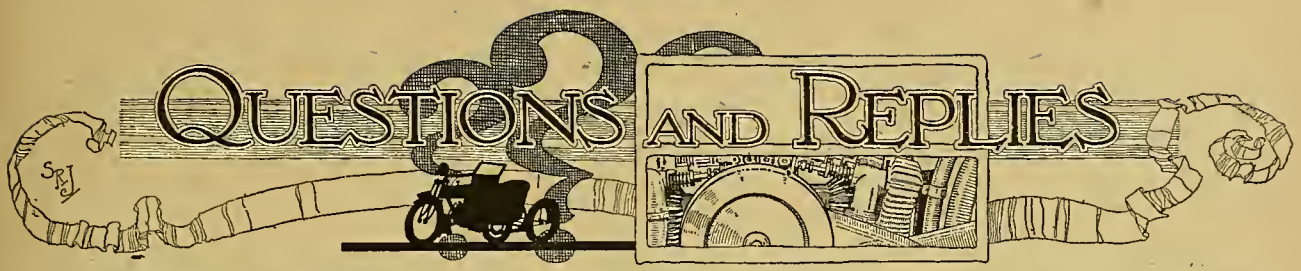
Sir,—Having read a lot of suggestions in *The Motor Cycle re* vaporising, I enclose a sketch of an appliance for vaporising petrol substitutes or paraffin. The water is circulated by the thermo-syphon principle. The engine can be started on petrol and turned on to the substitute when it is sufficiently warmed up. The carburetter is set into a copper



A vaporiser suggested by A. H Burslem.

cup, forming a water jacket round it. A small can containing water could be put conveniently on the frame, with a pipe round the flanges of the cylinder to the carburetter water jacket and a pipe from the carburetter water jacket back to the water tank, and so complete the water circulation. I have not tried this idea, but I think it is a suggestion for vaporising substitutes.

A. H. BURSLEM.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C., and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Charging from Magneto.

I have a high-tension magneto off a 3½ h.p. machine, and am wanting to use it for charging an accumulator, if possible. Will you please let me know if this can be done, and also how I must connect them in order to do so successfully?—G.W.

It is not in any way possible to charge accumulators from any kind of magneto. The current given by any magneto is alternating, and is, therefore, quite unsuitable.

Generator Trouble.

On a recent night I had a ride of about twenty-six miles; there were 8° of frost and a very cold wind. About half-way I was troubled with a poor light (acetylene), which finally went out. I found a good deal of water in the tubing, which is fairly long, as I light the sidecar and tail lights from the generator. After emptying the pipes I was twice troubled with the same difficulty. I have recently fitted a length of copper tubing; this is my worst experience of water in tubing. Would moisture in the carbide condense on the copper piping in the cold and cause this quantity of water? It was cold enough to freeze the water in the generator while waiting. The other morning there must have been teaspoonfuls of water in the piping, in spite of emptying the pipes three times the previous night. I am inclined to fit a rubber gasbag at the lowest point of the tubing to catch any water which may collect. I took the generator down: the filter pad was damp, but not wet.—H.E.N

We have never heard of water condensing in the copper pipe used for acetylene gas lighting. This, we think, is more likely to be water which reaches the pipe through a fault in the generator, or from some outside cause, or through your generator at some time having been flooded. Perhaps the gas orifice is partially stopped up. See that all the orifices in the generator are quite free, and that the generator is scrupulously clean in every part. Fill your container only two-thirds full, and we do not think you will suffer from this trouble again. In very frosty weather it is advisable to leave the generator empty, and only fill up just before you require the lamp, and then with tepid water. When once the lamp has been lit the generation of the gas in the generator gives heat, and this prevents the water from freezing. Take out the filter and dry it.

Difficult Starting.

I have a 2¾ h.p. V twin motor cycle about three years old. In the cold weather I find it extremely difficult to start. I inject plenty of petrol into the compression taps, but then it takes me about fifteen minutes to start it by pedalling, even if I put more petrol in the compression taps. I should be very much obliged if you could give me a little advice.—L.C.P.

The most usual causes of difficult starting are as follow, and we think if you check all the items given you should be able to overcome the trouble: (1.) Partially choked jet. (2.) Air leaks between the carburetter and inlet ports. (Bind all doubtful joints with insulating tape.) (3.) Contact breaker points not breaking or making contact properly. The points should be clean and flat, and separate .4 mm.—roughly, the thickness of a visiting card. (4.) Plug points should be clean and free from oil, with a gap of about $\frac{1}{32}$in. (5.) See that the magneto generally is in good order, carbon brushes clean, and making good contact. (6.) See that the valves are closing properly and the valve springs strong enough. Clearance between the tappets should be .4 mm. To start, prime the engine with petrol in each cylinder to free the pistons, flood the carburetter, close the air lever, and open the throttle about a quarter. What is wanted is a strong mixture, and only a little of it. If still difficult, cut down the main air inlet.

A Herald of Spring.

Tyre Arrangement.

I have a 6 h.p. sidecar combination, and am going to rearrange the tyres as follows. An extra strong new cover for the back wheel. The tyre from the back wheel to be put on the front wheel, and the front wheel tyre to be put on the sidecar wheel. The back tyre has a fairly good tread on it, but the front tyre is worn pretty level, though is still a good cover. Would this arrangement be best, or would it be better to fit the tyre from the back wheel to the sidecar wheel, or is it necessary to have a good tyre on the sidecar? If so, would the front tyre do for the sidecar if I had it retreaded?—BC 1818.

The arrangement suggested is excellent. The wheel which has the easiest time of any in a sidecar combination is the sidecar wheel. It does not much matter which you put on this, provided it is fairly good. Retreading is rather a lottery.

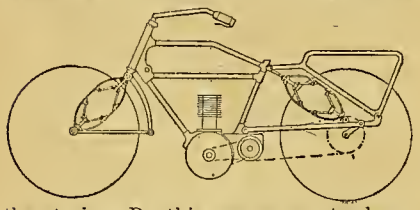
A Case of Late Timing.

I should be obliged if you could give me some advice about my cycle. It is a 2¾ h.p. Douglas (1913). Up till a short time ago I could run with the extra air lever fully open and control speeds with the throttle. Now the machine runs excessively noisily, and has no speed. When the throttle is opened the engine only vibrates heavily. It will take hardly any extra air, and cannot be throttled down at all without shutting out air altogether. On the road if I open the air suddenly the machine leaps forward for about fifty yards, and then coughs and splutters and I am forced to shut off the air. I have ground in the valves, and compression is all right. Could you tell me where the crank case release is on this machine? The jet is quite clear. Amac carburetter.—E.N.G.

The symptoms suggest that the timing of your magneto has slipped. Retime the ignition, and make sure that both the magneto sprocket and the driving sprocket fit properly on their respective shafts. See that both main jet and spraying jets are quite clear, and that petrol is flowing freely from the tank, and also through the passage to the jet. At this time of year it is important that all air drawn into the carburetter should be heated in order to prevent freezing in the carburetter or induction pipe. The crank case release valve is through the hollow crankshaft into the timing case.

A Springing System.

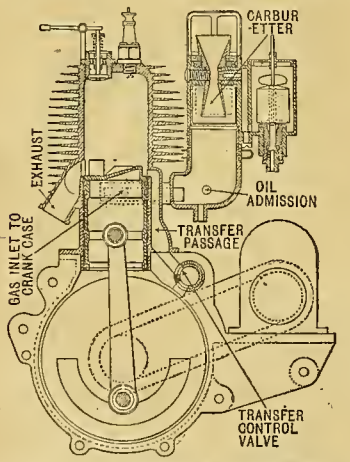
The feature of novelty is the arrangement of two leaf springs in the form of an ellipse, combined with link work, which distributes the strain throughout the length of the springs. The drawing shows back and front suspension, and in both cases it will be seen that movement of the wheel spindle tends to distort the elliptic springs. At the same time the link work is compressed in one direction and expanded in the other, increasing the resistance to movement and distributing



the strain. By this means any tendency for the springs to distort excessively at any one point is prevented, and breakage avoided.—W. J. Simpson, No. 143,931, 1915.

An Italian Two-stroke Engine.

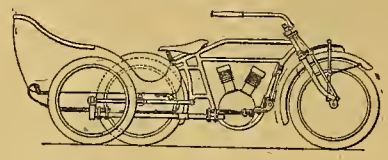
In this engine the charge is initially compressed in the crank chamber, and then passes to the cylinders by way of a transfer passage. The transfer passage is formed with a cylindrical enlargement in which is a rotatable sleeve whereby the passage of the mixture from the crank case to the cylinder can be controlled. The exhaust port is of the usual kind, and the inlet ports, which put the carburetter into communication with the crank case when the piston is at the top of its stroke, are elongated to present a large area of opening. The carburetter is

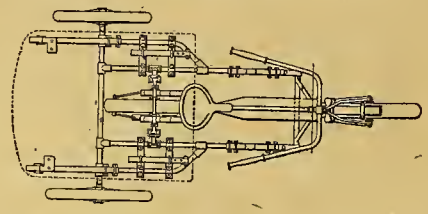


arranged in a chamber alongside the cylinder, and oil is led to this chamber so that it reaches the mixture just before it enters the crank case.—D. Ruva, No. 101,251.

A Trailer Attachment.

In view of the fact that a device of this nature is meeting with a certain measure of success in America, the accompanying elevation and plan of a rear passenger attachment may be of interest. The "rear car" is provided with an axle tube, from which project forwardly a pair of

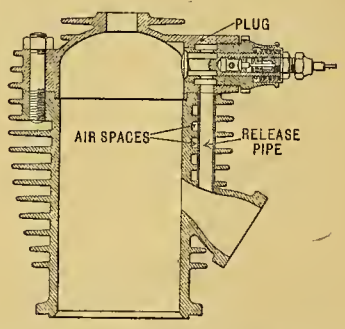




longitudinal members. These extend on either side of the motor cycle, and are connected through laminated springs with the frame just in front of the engine. The "rear car" body is mounted on its frame by means of springs, so that it is insulated from road shocks. The specification describes and illustrates the invention in great detail.—O. L. Heintz, No. 16,055, 1915.

Compression Release Mechanism.

The feature of this invention is the employment of a loose pipe for conducting the gas from the combustion chamber to the exhaust passage, when the control



valve is opened. The radiating fins are drilled through and the pipe inserted, the upper aperture then being plugged. An air space is left around the pipe as shown. The invention is not restricted to engines having a detachable cylinder head.—Villiers Engineering Co., Ltd., and G. Funck, No. 102,002.

DELAYS IN POSTAL DELIVERIES.

In view of depleted staffs, the curtailment of railway services, and the consequent delay in delivery of mails, readers will greatly assist by forwarding communications (including advertisements) as much as possible in advance of the dates of the issues for which they are intended.

Generosity to Soldiers Appreciated.

A gunner in the Tanks writes in appreciation of the action of the Austin Motor Co., Ltd., Prince of Wales Road, Norwich, in allowing soldiers to garage their motor cycles free of charge.

A Motor Ambulance.

The staff of the Far Eastern depots of the Asiatic Petroleum Co., Ltd., has presented a motor ambulance to the British Red Cross. The ambulance is well equipped, and capable of carrying four wounded soldiers.

Burberrys Sale.

The well-known firm of Burberrys are still holding the sale which began on January 1st of both men's and women's garments of every kind and size suitable for both winter and summer riding. Much of the stock is to be sold at one-half, and in some cases less than half, current prices. Readers are advised to write to Burberrys, Haymarket, London, S.W., for their sale list.

Lodge Sparking Plugs.

We have received from the Lodge Co., Ltd., Rugby, a useful brochure dealing with twenty differently designed plugs of their manufacture. A chapter entitled "How to Choose a Sparking Plug" is of particular interest at the moment. High speed and high compression engines are frequently fitted with plugs more suitable for low compressioned sidecar outfits, and in consequence grumbles at the efficiency of plugs are only too frequent.

Comfort Motor Cycle Accessories.

Kumfort accessories for motor cycles are fairly well known to our readers, having been referred to in these columns on several occasions. These products will in future be known by the ordinary spelling of the name. The company should now be addressed, "The Comfort Motor Cycle and Accessories Co., Cookham, Berks."

The Sphinx Plug Range.

The Sphinx Manufacturing Co., of Birmingham, makers of the well-known Sphinx plugs, have issued a most attractive catalogue and price list of their plugs, a very large range of which is described and illustrated. This publication has been much delayed owing to shortage of labour, but all applications for the booklet are being executed as quickly as possible and in strict rotation. Among the plugs illustrated is a new model designed specially for use in two-strokes or in engines which are inclined to be oily. The electrodes are protected from oil by shields.

Bowden Wire Ltd. of London

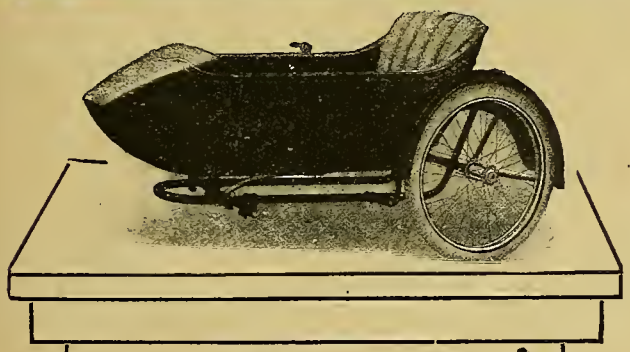
Manufacturers of Bowden Wire and of all Levers and Accessories used in its application.

Established 1897.

Trade Marks and Names:
Bowdensolo Bowdenoir
Bowdcnamel Bowdenite
Bowdensilver Bowdenbrass

Orders filled only as Government requirements permit.

Victoria Rd., Willesden Junction, N.W.



The *Canoelet* STANDS ALONE

—In splendid isolation the "Canoelet" Sidecar remains the perfect example of the engineers' skill and the body-builders' craft. Synonymous with comfort, "Canoelet" means all-round sidecar satisfaction, especially for the lady who has been used to riding in a car. She will appreciate the luxury of the "Canoelet."

MEAD & DEAKIN, Tyseley, BIRMINGHAM.

I SUBMIT there

is a solid reason why you should adopt a

BINKS CARBURETTER, viz.:

YOU CUT YOUR FUEL BILL IN TWO

if you adopt my system and use my fuel. You can, of course, use petrol or benzol without alteration.

Price of Carburetter complete—

49/-

plus 10% extra war cost.

FIT ANY MACHINE.

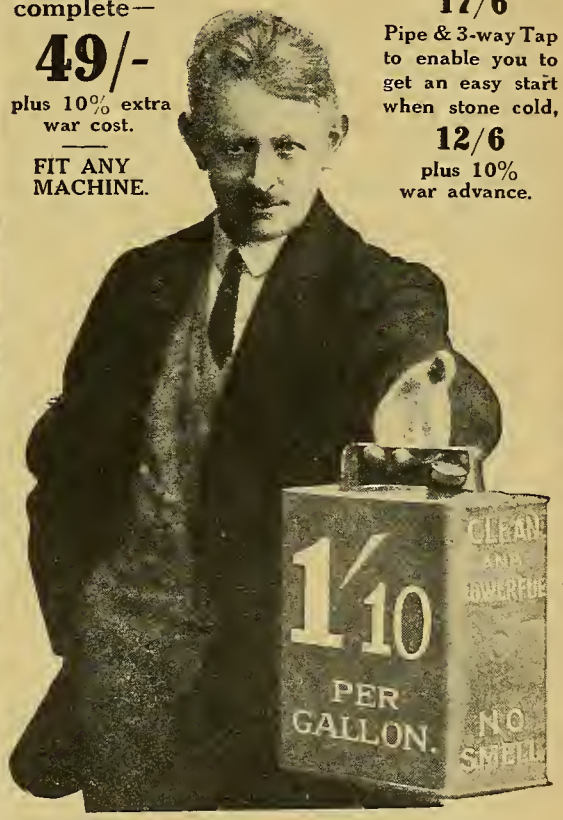
Small extra Tank to clip on Frame,

17/6

Pipe & 3-way Tap to enable you to get an easy start when stone cold,

12/6

plus 10% war advance.



READ!

MY 3-PHASE JET DAMPING CARBURETTERS

have such perfect vaporising properties that they enable you to use fuel at **1/10** per gallon in 42-gallon casks, which you are allowed to keep on your premises. Casks **12/6** each, returnable at **10/-** each. Your engine will tick over dead slow, and pull dead slow in traffic, yet give the full power. It is almost impossible to tell you are not running on petrol at **3/-** a gallon. It cannot damage your engine or soot it up, and makes Motor Cycling possible in these times.

I give you my personal assurance of the truth of what is stated above. Please send at once for full particulars of the carburetter, and also for my Treatise on Carburation, and terms of One Month's Approval Trial.

C. BINKS, Ltd., Eccles.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted Series discounts and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed ——— & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed, "No. ooo, c/o 'The Motor Cycle,' 20, Tudor Street, E.C."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged, when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.B.C.

A.B.C. for Sale, 1914, in fine condition, lamps and speedometer, new tyres.—Box 615, c/o *The Motor Cycle.* [X4144

Abingdon.

1914 Abingdon, 3-speed, T.T. model; £34.—Ross, 86, High Rd., Lee. [6786

A.J.S.

1914 2¾h.p. A.J.S., 3-speed, lamps, and speedometer; £40.—Fryers, Hereford. [X4051

A.J.S. Spares · prompt delivery.—Cyril Williams, A.J.S. Agent, Chapel Ash Depot, Wolverhampton. [X4090

A.J.S., 1913, 6h.p. twin, and coachbuilt sidecar, in perfect condition; £45.—Alhon's, 119, Ripple Rd., Barking, Essex. [6914

A.J.S., 1916½, 2¾h.p., 3-speed, kick start, hand clutch, many extras, little used, condition as new; £50, no offers.—Bradbury, Heath Grove, Buxton. [X4217

A.J.S., 1915, 3-speed, kick start, hand clutch, new tyres, all accessories; £44/10; deferred payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6880

A.J.S. Special New Year Bargain.—Late 1916 2¾h.p., single-cyl., 3-speed, semi T.T. bars, quick detachable back wheel, handle-bar clutch, kick starter, etc., only slightly soiled; £52.—The Premier Motor Co., Aston Rd., Birmingham. [6832

HOW YOU CAN TELL!

When smiles of satisfaction
Crown the first day's test,
And miles of even running
Prove you've got the best;
When the engine never falters,
Though the speed be what you like—
The explanation's simple—
"You've bought a Godfrey's Bike."

Attention to details, careful testing and adjustments to both new and second-hand machines, a strict rule to let nothing go out (irrespective of price) which would not uphold the reputation of the Firm—and you have the reasons for the ever-increasing popularity of GODFREY'S.

NEW MODELS

In Stock include—

B.S.A., ROVER, JAMES, ZENITH, ENFIELD, ALLDAYS, NEW IMPERIAL, COVENTRY EAGLE, LEVIS, CALTHORPE.

If you cannot pay our Showrooms a visit, write for our full list of new and second-hand machines.

Exchanges. *Easy Terms.*

GODFREY'S LTD.

208, Gt. Portland St., LONDON, W.

'Phone: 7091 Mayfair (2 lines).

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. 1912 6h.p. Twin Combination; £40.—Tuke and Bell, Ltd., Motor Dept., Carlton Engineering Works, High Rd., Tottenham, N. [4915

A.J.S., 1916, 2¾h.p., 3-speed sporting model, used 500 miles, pretty and perfect little specimen, complete with Lucas head lamp, Lucas horn, tail lamp, speedometer and spares; cost £70, accept £55.—Layton's Garage, Bicester, Oxon. [7066

Alldays.

ALLON, 1916½, 2-speed, 2-stroke, as new, spares, accessories; £35.—French, Seaford. [7040

RIDER TROWARD, 78, High St., Hampstead.—1916 Alldays Allon, 2-speed; 29 gns. [6967

COLMORE Depot, 31, Colmore Row, Birmingham, can supply immediately all models of Alldays Allon. [0796

1916 2-speed Alldays Allon, brand new, shop-soiled, not scratched; £40 cash.—Jones, Garage, Broadway, Muswell Hill. [7084

NEW Allons, 2-speed, 2-stroke, 2½h.p., 1917 models; £42; easy terms 2% extra, or exchanges arranged.—Wauchope's, 9, Shoe Lane, London. [6946

ALLONS.—All models acually in stock, £37/18 to £47/5; exchanges, deferred payments.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [6877

1915 Countershaft Alldays, 4h.p., 3-speed, clutch, complete with lamps, horn, etc., footboards, reliable machine; £45; exchnnges.—Newnhem, 223, Hammersmith Rd., W. 'Phone: 80. [6982

Ariel.

1917 Ariel, 3½h.p., in stock; £65/10.—Ross, 86, High Rd., Lee. [6783

ARIEL, 3½h.p., latest 3-speed model, actually in stock.—Crow Bros., Guildford. [6366

ARIEL, 3½h.p., Bosch, B. and B., etc., low and perfect; £15.—Smith, 199b, King St., Hammersmith. [6999

3½h.p. Ariel, 1912, fine condition, complete, with mechanical horn; £12.—21, Derby Rd., West Green. [7013

RIDER TROWARD, 78, High St., Hampstead.—1913 Ariel variable gear, re-enamelled, fast; 21 gns. [6978

ARIEL, 3½h.p., semi-T.T., with variable pulley gear, fast, and in excellent condition; £22.—Layton's Garage, Bicester, Oxon. [7069

COLMORE Depot, 31, Colmore Row, Birmingham, have in stock for immediate delivery all models of Ariel motor cycles, with or without sidecars. [0797

1917 New Ariels in stock, 3-speed countershaft gear, clutch, and kick start, chain-cum-belt drive, £65/10; easy terms 2% extra, or exchange arranged.—Wauchope's, 9, Shoe Lane, London. [6943

1912½ Ariel, 3½h.p., and sidecar, decompressor, variable gear, drip feed, spring seat-pillar, lamps, tools, spares, condition as new; any trial; bargain, £27.—Woodcock, 756, Romford Rd., Manor Park, Essex. [6958

I CAN Give immediate delivery of 1917 5-6h.p. Ariels, 3½h.p. Ariels, solo or combinations; also 1916 5-6 h.p. combination, as new, guaranteed, £80; exchanges or deferred payments.—Jones, Garage, Broadway, Muswell Hill. [7078

ARIEL and Coachbuilt Sidecar, late 1915 model, 3½h.p., 3-speed, countershaft driven, clutch, decompressor, kick starter, speedometer, lamps, spares, etc., only done 3,000 miles, owner going to Front, only reason for selling; £50, or very near offer accepted.—Box L2,884, c/o *The Motor Cycle.* [7106

Atilier.

ATILIER, 3½h.p., free engine, Bosch, B. and B.; £8.—21, Fordel Rd., Catford. [X4088

Auto-Wheels.

AUTO-WHEEL, B.S.A. Model de Luxe, in perfect order; £10.—Slade, Nayland, Colchester. [X4174

AUTO-WHEEL, 1915, like new; £10/10.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6592

AUTO-WHEEL, B.S.A. De Luxe, good condition, Hammond shock absorber fitted; £5/15.—Mead, Draper, Amersham, Bucks. [6837

Bat.

BATS.—Latest 4-5h.p. sporting model in stock,—2 speeds, etc.; £63/5.—Below.

BAT, 5-6h.p. sporting model, 3-speed hub gear, usual accessories, good condition; £32.—P. J. Evans, John Bright St., Birmingham. [X4162

1914 Bat, 4-5h.p., 2-speed, countershaft, very fast; £34.—Ross, 86, High Rd., Lee. [6780

NEW Bats from stock, 2-speed gear models, solo mounts; £63/5.—Wauchope's, 9, Shoe Lane, London. [6945

BAT-J.A.P., 5-6h.p., 1913½, 3 speeds, clutch, T.T. model; £33; exchange combination.—Saul, Tisbury, Salisbury. [7046

MOTOR CYCLES FOR SALE.

Bat.

1912 Bat-Jap, 8h.p., free engine, splendid condition; no use to owner; £12.—Howard, 61, Hyde Rd., West Gorton, Manchester. [6852

Bradbury.

1912 3½h.p. Bradbury, good condition throughout; £16.—Haines, 8, Adelaide Sq., Bedford. [X4153

1914 Bradbury, clutch model, splendid condition; £25, bargain, or lightweight and cash.—Wyatt, Hunstanton. [X4018

BRADBURY, 4h.p., 1912, free engine, excellent running order; bargain, £14.—1, St. George's Rd., Folkestone. [X4218

BRADBURY, 1913, Sturmey-Archer 3-speed, 1916 B. and B., extra heavy tyres, lamps, etc., complete; £28.—Mills, Lordswood, Southampton. [6903

BRADBURY, 3½h.p., with sidecar, Bosch mag., Binks carburetter, N.S.U. 2-speed, free engine, new tyres good running order; £30.—Oliver, Clifton, Biggleswade, Beds. [6940

BRADBURY, 4h.p., 3-speed, coachbuilt sidecar, free engine, new tyres, just overhauled; genuine bargain; must be sold; what offers?—Apply, C. Wood, Forest Brickfields, Coopersale, Essex. [X4151

Brough.

1914 Brough, T.T., 3½h.p., 2-speed, opposed twin; £36.—Ross, 86, High Rd., Lee. [6789

BROUGH, late 1915, 3½h.p. flat twin, T.T. model, 2-speed countershaft, very fast, little used, perfect condition, all accessories; £45.—Apply, 60, Marine Parade, Sheerness. [X4205

OWNER Going Abroad, offers for quick sale 1915 Brough, 3½h.p., excellent condition; sacrifice £25.—Parkinson, 33, Westbury Rd., Woodside Park, North Finchley. [X3917

Brown.

RIDER TROWARD, 78, High St., Hampstead.—1912 3½h.p. T.T. Brown, re-enamelled, fast; 15 gns. [6974

1913 Brown-Precision 2¾h.p. Lightweight, Bosch, B. and B., Dunlop tyres, good condition; £16.—Palmer, 45, Coral St., Waterloo Rd., S.E. [6823

3½h.p. Brown, Bosch, B.B., good running order; £6/10; appointment by post.—Private Henson, c/o 113, Coulsden Rd., Caterham, Surrey. [7010

B.S.A.

B.S.A., 1917 models H and K, with sidecars, in stock.—Moss, Wem. [X4190

COLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A., 1913, 2-speed, exceptionally fine order, perfect; £30.—Wallis Motors, Hereford. [6872

B.S.A., 3½h.p., 1915, T.T., very fast, new; £40.—9, The Terrace, Hampton Wick, Middlesex. [6925

B.S.A., 1912, good condition, fast, good tyres; £17, no offers.—A. Beck, 9, Hedon Rd., Hull. [6915

NEW B.S.A., chain drive, in stock; exchanges quoted; £66.—Motor Exchange, Horton St., Halifax. [6661

B.S.A., 4¼h.p., chain drive, 1916, sidecar, screen, lamp; £64.—W. Fuller, Baker, Semley Place, Ebury Sq., S.W. [6802

B.S.A., 4¾h.p., 1914, chain drive, 3-speed, countershaft gear, B.S.A. Canoelet sidecar; offer.—Walshams, 60, Doughty St., W.C. [6812

B.S.A., 1916, 4¼h.p., 3-speed, kick starter, speedometer, horn, lamps, original tyres, unused since July; £55.—H. Jones, Anstey, Coventry. [X4215

B.S.A., 1913-14, 2-speed, free engine, 3½h.p., Spur sidecar, lately overhauled by makers; bargain, 35 gns.—Owner, 27, St. John's Rd., Putney. [6919

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert J. Pitts, Redditch. Tel.: 91. [X0529

B.S.A., model H, 3-speed, chain drive, with superior C.B. sidecar, lamps, horn, tools, etc., a very fine outfit; 60 gns.—Layton's Garage, Bicester, Oxon. [7068

1913 B.S.A. 2-speed, two in stock, belt drive, also one chain drive, £30 each; deferred payments arranged.—Jones, Garage, Broadway, Muswell Hill. [7086

B.S.A., 1914, 3½h.p., with lamps, tools, and speedometer, in good condition, a fast machine; £30, or good offer.—Tebb, Corpus Christi College, Cambridge. Tel.: 774. [6819

B.S.A., 1913, 3½h.p., Grado Multi, large head lamp, rear lamp, speedometer, horn, auxiliary tank connected to carburetter; £30.—Box L2,882, c/o *The Motor Cycle.* (D) [6830

1917 B.S.A.'s, all models from absolute stock; cash, deferred, or exchanges. Douglases preferred.—Jones, Garage, Broadway, Muswell Hill. 'Phone: Hornsey 2562. [7079

B.S.A., 1914, 3-speed, in good running order; any trial; owner having no further use for same; £40, or near offer.—F. Keel, 4, Range Villas, Shepperton-on-Thames, Middlesex. [7031

1917 B.S.A.'s, models H and K absolutely in stock; also 1914 4 months' old model K, with No. 1 B.S.A. sidecar, all lamps, etc., a rare bargain, £67/10; deferred payments, exchanges.—Jones, Garage, Broadway, Muswell Hill. [7085

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TRIUMPH, 1914, 4 h.p., 3-speed, Bosch.....***£48**
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Machines starred (*) are complete with lamps, horn, etc.

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B.S.A., 3½ h.p., Model D, T.T. **£52 10**
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ROVER, 1917, 3½ h.p., T.T., Philipson pulley **£61 10**
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B.S.A., model K, 1915, 4¼h.p., 3-speed, with almost new semi-sporting coachbuilt sidecar, lamp, horn, etc., overhauled throughout, very sound outfit; £58.—Layton's Garage, Bicester, Oxon. [7067

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4¼h.p. 1915 B.S.A., countershaft, 3-speed gear and kick start, free engine, fitted with a handsome Middleton coachbuilt sidecar, complete with all accessories, £60, guaranteed; also a solo B.S.A., same condition and model, 50 gns.—Wauchope's, City Agents for B.S.A. machines, 9, Shoe Lane, London, E.C. [6943

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CALTHORPE-J.A.P., 1916, 2-speed, with lamp, horn, ridden 400 miles only; £35/10.—Lamb's, 151, High St., Walthamstow. [6882

CALTHORPE Junior, 2-speed, excellent condition, easy starter; bargain, £10, no offers.—Harrison, 55, High St., Eastleigh. [7014

CALTHORPE Junior, 1914, 2h.p., 2-speed, requires new cylinder and camshaft; 5 gns.—Cockburn, Dorisdene, Flower Lane, Mill Hill, N.W. [6822

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CALTHORPE-J.A.P., 2¾h.p., Enfield 2-speed, perfect, almost new, enamel and plate unscratched; bargain, £26/10.—Phillips, Tobacconist, Ware Herts. [6900

1916 Calthorpe, 2¾h.p. J.A.P., Enfield 2-speed gear, horn, lamp, accessories, run only 500 miles; £26.—Urquhart, 49, Hurlingham Court, Putney Bridge. [7030

CALTHORPE-J.A.P., 1916, 2-speed, free engine, clutch, equal new, accessories; trial; bargain, £27; owner enlisted.—174, Barcombe Av., Streatham Hill, S.W. [6864

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CAMPION-J.A.P. 1916 Combination, Bosch mag., fitted electric light, only slight use.—Apply, Box 615, c/o *The Motor Cycle.* [X4094

4¼h.p. 1914 All-black Campion-Precision, 2 speeds, grey Swan sidecar, splendid condition; £60.—Baucroft, 29, Belvoir Rd., Coalville. [X3919

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CHATER-LEA 5-6h.p. Twin, £15; sidecar, £3.—Miss May, 66, Greyhound Lane, Streatham, S.W. [6793

8h.p. No. 7 Chater-Lea Coach Combination, lamps, spare chains, 700×80 tyres, speedometer; £45.—F.W., 31, Relf Rd., Peckham Rye. [X4040

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1916 3½h.p. Precision Engine, Chater-Lea frame, T.T. model, very sporty and brand new, never been ridden; a real good, cheap lot, £27/10; first viewer will purchase.—Jones, Garage, Broadway, Muswell Hill. [7090

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CHATER-REX, 3½h.p., low built, spring forks, C.A.V. mag., B. and B. carburetter; £10.—388, Clapham Rd., S.W. [6860

Clyno.

CLYNO 1912 6h.p. Combination; £35/10.—Motor Exchange, Horton St., Halifax. [6663

CLYNO, a beauty, Canoelet sidecar, enamelled to match, almost new; £42.—Bunting, Harrow. [6775

CLYNO, 1913-14, 6h.p., 3-speed countershaft, chain drive; £39/10.—Motor Exchange, Horton St., Halifax. [6662

Connaught.

CONNAUGHT, 1914, standard model, lamp, horn, spares, etc., sound condition; £17.—Low, 36, Kenilworth Rd., Ealing. [X3932

CONNAUGHT, 1916, fitted Dunlop tyres and belt, guaranteed perfect order; £20.—Firth's, Woodbridge Rd., Moseley, Birmingham. [X4197

BIRMINGHAM Agent, P. J. Evans, John Bright St.—1917 models of the famous Connaught 2-stroke, standard 2¾-3h.p. models, either solo or with sidecar; miniature models, single or 2-speed countershaft gear; prices from 27 gns. [X4166

Coventry Eagle.

COVENTRY Eagle, 1916, 6h.p., 3-speed countershaft, coach sidecar, and accessories; cost £100, little used, £69/10.—Motor Exchange, Horton St., Halifax. [6665

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DE DION, 2¾h.p., B.B., new heavy rubber studded Kempshall back, accumulator, in good running order, £7, or exchange for late Auto-Wheel, must be in good working order and condition.—Chandler, Kalabani, Ramsgate Rd., Margate. [6835

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1911 Douglas, splendid condition, tyres good; £12.—101, Tooting Bec Rd., S.W. [6859

DOUGLAS, late 1913, kick start, little used, accessories, spares.—C. White, West Mersea. [6803

DOUGLAS, 1914, perfect condition, fully equipped; £37/10.—S. Alderton, 426, Strand, W.C. [6894

DOUGLAS, 1914, 2-speed, T.T., Lucas lamps and horn; £32.—2, Honywood Rd., Colchester. [7028

1912 Douglas, 2-speed, large tyres, accessories; £28.—Shand, 14, Brandram Rd., Lee, London. [7012

1916 Douglas, nearly new, all accessories; £55.—Apply, MacLean, 9, Longfield Rd., Ealing. [6778

DOUGLAS, 2¾h.p., 1910, mag., ready ride away; £10.—152, Camberwell Grove, Camberwell. [6939

LATE 1915 2¾h.p. Black Douglas, only run a few miles; £43.—Lewis, 61, London Rd., Twickenham. [6829

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1915 Douglas, in fine order, 3 speeds, lamps, horn, numbers, etc.; £46.—Cross, Effingham Sq., Rotherham. [X4156

DOUGLAS, 2¾h.p., single speed, good condition, 1913; must sell; £22/10.—17, Goldhawk Rd., Shepherd's Bush, London. [6863

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1915 2¾h.p. Douglas, W, 3-speed, clutch, engine perfect, ridden very little, nearly new, with accessories; £52/10.—Robinson's Garage, Green St., Cambridge. [7055

DOUGLAS, 4h.p., T.T., October, 1915, 3 speeds, torpedo sidecar, spares, accessories, perfect condition; seen any time; £53.—Randall, 88, Church Rd., Barnes, S.W. [6926

DOUGLAS, 1914, 2¾h.p., 2-speed, fully equipped, speedometer, accessories, and spares.—Pierre-husson, Primrose House Garage, Clarence Lane, Roehampton, S.W. [6934

1914 2¾h.p. T.T. Douglas, 2-speed, new Dunlops, B170 saddle, 2 Lucas lamp sets, horn, Stewart speedometer, excellent condition; £38/10.—Robinson's Garage, Green St., Cambridge. [7057

DOUGLAS, 4h.p., and sidecar, 3 speeds, clutch, kick starter, new February, 1915, only used week-ends, tyres and condition excellent, spares; £70.—Newnham, 51, Limes Av., New Southgate. [X3920

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ENFIELD, 2-stroke, 2-speed	42 gns.	
ENFIELD, 3 h.p., twin, 2-speed	55 gns.	
ENFIELD, 6 h.p. Combination	90 gns.	
ENFIELD, 6 h.p. Combination, with Lucas dynamo lighting set	105 gns.	
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MATCHLESS, 1913, 8 h.p., 2-speed, clutch, and kick-starter, all accessories	£38
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PREMIER, 1915, 3½ h.p., countershaft, 3-sp. gear, lamps, and horn	£45
CALTHORPE, 1915, 2½ h.p., 2-str., 2-sp., headlight, rear lamp, horn, & speedometer	£28
VINDEC, 1911, 5 h.p., 2-sp., headlight, rear lamp, horn, and coachbuilt Sidecar	£22
CHATER-J.A.P., 1912, 8 h.p., countershaft, 3-sp. gear, all-chain drive, and coachbuilt Sidecar	£45
DOUGLAS, 1915, 2¾ h.p., War Office model	£50
ALLDAYS MATCHLESS, 1915, 3½ h.p., coachbuilt Combination, 3-sp., lamps, and horn	£45
TRIUMPH, 1914, 4 h.p., 3-speed	£40
JAMES, 1916, 2½ h.p., 2-stroke, 2-sp., lamps, and horn	£36
B.S.A., 1916, 4½ h.p., 3-sp., all-chain drive, lamps, horn, and Canoelet Sidecar	£63
ROYAL ENFIELD, 1914, 3 h.p., twin, 2-speed	£32
DOUGLAS, 1910, 2¾ h.p., lamps, and horn	£15
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DOUGLAS, 2¾h.p., 1913, 2-speed, T.T. bars, new frame (late pattern), engine overhauled by makers October, 1915, under 1,500 miles since, privately owned, carefully driven, no Pilhion or sidecar work, tank re-enamelled, appearance very good, machine running well; reason for sale, bought W.D. model; £33, accessories.—Richards, 3, Arundel St., Strand. [6931

Enfield.

3h.p. Twin Enfield, in perfect condition; £27/10.—Chilton, High St., Watford. [6995

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

3h.p. Enfield, little used; £32, offers; must sell.—18, Gowlett Rd., Peckham. Appointment. [6792

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1916 Enfield, 3h.p., all accessories, very fast; £39.—Ross, 86, High Rd., Lee. [6782

ENFIELD, 1916, 6h.p., dynamo lighting outfit, hood and screen; £85.—Box L2,872, c/o *The Motor Cycle*. [7111

E. KICKHAM, Stokes Croft, Bristol.—1915 2-speed 3h.p. Enfield, all accessories, condition as new; £40. [X3925

ENFIELD 3h.p. Twin, 2-speed, free, pedal start, good order, fast; £20.—14, Dodbrooke Rd., West Norwood. [0878

ENFIELD, 6h.p., and sidecar, grand outfit, had little use; bargain, £65.—156, Stockport Rd., Gee Cross, Hyde. [X4091

ENFIELD Combination.—New models in stock; 6h.p. 2-speed £94/10; cash, exchange, or deferred payment terms.—Below.

ENFIELD Combination, 1916, 6h.p., 2-speed, dynamo lighting outfit, good condition; £80.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0480

1913 2¾h.p. Enfield Twin, 2-speed, clutch, Binks 3-jet, little used; £21, or close.—H., 9, Trafalgar Rd., Birkdale, Lancs. [X4083

1917 6h.p. Enfield Combination, almost as new, and accessories; seen any time; £85.—Bounds, Garage, 223, High Rd., Kilburn. [6895

ENFIELD 1916 6h.p. Combination, little used, guaranteed perfect condition throughout, complete with accessories; £69.—Moss, Wem. [X4193

1916 Royal Enfield, 3h.p., delivered November, mileage 250; cost £61, cash £53.—Marcus Draper, R.F.C., Exeter College, Oxford. [6913

6h.p. Royal Enfield 1913 Combination, in very fine order; £45.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [7051

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock for immediate delivery.—See below.

1917 6h.p. Enfield Coachbuilt Combination, with apron and mat, 2 speeds, clutch and starter, 90 gns.; extra for hood and screen, £4/19; Lucas lighting set, 15 gns.; 8h.p. J.A.P. engine, £2.—Below.

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1917 Enfield 2-stroke, 2¼h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright St., Birmingham. [X4169

1916 Enfield Combination, lamps, mechanical horn, wind screen, spare valves and chains; £72.—4, Thornton St., Kempston, Bedford. [7043

3h.p. Enfield, 1914-15, 2-speed, kick start, lamps, horn, speedometer, back rest, good condition; £34.—27, Malmesbury Park Rd., Bournemouth. [7047

1916 Enfield Combination, Lucas dynamo lighting, speedometer, practically new; bargain, 80 gns.—M., 5, Rugby Mansions, W. Kensington. [7011

ENFIELD, 3h.p., late 1915, kick starter, new tyres, in new condition, all accessories; £39, or near.—W. Ayers, Garage, Kensington Palace, W. [6868

ENFIELD 1916 Combination, not done 1,000, triple screen, Stewart meter, all spares; £80; expert examination.—Moyse, Photographer, Muswell Hill, N. [X4212

1915 6h.p. Enfield Combination, in perfect condition, P. and H.; £62/10; lamps, Lucas horn, and accessories; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [6896

ENFIELD Combination, 90 gns.; 3h.p. twin, £57/10; 2-speed, 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

RIDER TROWARD, 78, High St., Hampstead.—1913 Enfield coachbuilt combination, good condition, 39 gns.; 1914 Enfield coachbuilt combination, perfect, all tyres new, 49 gns. [6961

1916 6h.p. Enfield Combination, complete with lamps, speedometer, horn, and accessories, not done 800 miles, perfect; 75 gns.—Wellboy Garage, Woodford Rd., Forest Gate. Tel.: Stratford 309. [6869

MOTOR CYCLES FOR SALE.

Enfield.

1916 3h.p. 2-speed Clutch Twin Enfield, acetylene head and tail lamps, mechanical horn, full kit tools, new Palmer cords, new October, run 200 miles; cost £61, cash £52.—Hunstone, Exeter Cottage, Oxford. [6866

1916 3h.p. Enfield, 2-speed, kick start, Millers head and Lucas rear lamps, mechanical horn, Thompson-Bennett mag., ridden 500 miles only; bargain, £42/10.—Robinson's Garage, Green St., Cambridge. [7058

ENFIELD 6h.p. Combination, late 1916, speedometer, lamps, tools, indistinguishable from new, new, silent and powerful, and guaranteed perfect throughout; £75, accept Douglas or Triumph part.—280, Camberwell Rd., S.E. [7045

ENFIELD, late 1916 3h.p. twin Royal Enfield, 2-speed, chain drive, 26×2¼ Palmer cord tyres, lamp, horn, and tail lamp, not done 500 miles, and guaranteed as new; £42.—The Premier Motor Co., Aston Rd., Birmingham. [6843

ENFIELD, 1916, 3h.p., 2-speed, kick start, complete; cost £60, accept £46; this machine has been used 50 miles only, and is offered because owner, wounded leg, finds it impossible to use a motor cycle.—Layton's Garage, Bicester, Oxon. [7071

ENFIELD 6h.p. 1917 2-seater Combination, £97/10/3; 3h.p. solo models, T.T. touring, £57/15; actually in stock; good prices offered for up-to-date machines in part exchange; deferred terms if desired. Also 1916 6h.p., horn, 3 lamps, condition unscratched, £85; 3h.p. 1916, ridden 2,000 to 3,000 miles, £45/10; and two 1915's, 3h.p., all accessories, ridden under 1,500 miles, £43/10; and 1916 commercial combination, new two months ago, ridden 400 miles, £87/10, all accessories.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169, and Hornsey 1956. [6878

Excelsior.

RIDER TROWARD, 78, High St., Hampstead.—Excelsior, 3h.p., Bosch, new carburetter, dropped top tube, pan saddle; 8 gns. [6975

EXCELSIOR, 1916, 7h.p., 3-speed, and coach sidecar, used for demonstration; £69/10, cash bargain.—Motor Exchange, Horton St., Halifax. [6666

BRITISH Excelsior, 4½h.p., late 1913, coachbuilt sidecar, Sturmey-Archer 3-speed hub, free engine, speedometer, 3 lamps and generator, 2 horns, and watch, tyres nearly new, tools, in sound condition, little used; 35 gns.—Smith, 54, Wellington St., Luton. [X4142

EXCELSIOR, special New Year Bargain.—Brand new American Excelsior, 7h.p., 3-speed, with all latest improvements, new type kick starter, gear box, mechanical oil pump, etc., as listed at £75, our price £65 cash, or with special Montgomery coachbuilt sidecar, enamelled to match, £80.—To be obtained only from the Premier Motor Co., Aston Rd., Birmingham. [6844

Fafnir.

FAFNIR Combination, 2-speed, mag.; £20; good condition.—John Ash, 140, Powis St., Woolwich. [6867

3½h.p. Fafnir Combination (no body), mag., B. and B., N.S.U. 2-speed, ready to ride; £12/10.—Garage, The Green, Southgate, N. [X4213

F.N.

2¾h.p. F.N., Bosch mag., clutch, splendid condition, £10; also 1912 F.N., 4-cyl., clutch, £15.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station [7054

1911 F.N., new gears, tank, bars, Amac, dropped frame, economical, fast, reliable, splendid condition; £18.—Voss, 103, Churchfield Rd., Acton. (D) [6935

Grandex.

1914 Grandex-Precision, 2½h.p., 3-speed Sturmey gear; £13/15, bargain.—54, Seymour Rd., Leyton, E. [6899

Harley-Davidson.

1915 Harley-Davidson Combination, all brown model, all accessories; £62.—Ross, 86, High Rd., Lee [6784

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for immediate delivery of Harley-Davidsons. Spares, 24 hours' service. [6244

1915 Harley-Davidson, 3-speed, fully equipped, with special Swan sidecar, lamps, etc.; £65.—Ray, 10, Elms Buildings, Eastbourne. [6806

HARLEY-DAVIDSON, 1915, 7-9h.p., with Ivy sidecar, all accessories, first-class order; £60.—Mannington, Gravel Walk, Canterbury. [X4171

LATE 1915 Harley-Davidson, 7-9h.p., Millford sidecar, splendid condition; owner called up; bargain, £60.—J. Bardwell, Belle Vue, Mansfield. [X4056

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802

TWIN-CYL. 8h.p. Harley-Davidson Motor Cycle, 1915 model, as new, only run 800 miles; would accept £70, or offer, for a quick sale.—Robb, Chiltley Place, Liphook. [6814

HARLEY-DAVIDSON, 1915, dynamo lighting model, gone 3,000, good condition; £55, or near offer; any inspection invited.—Hawkes, 11, West Heath Av., Golders Green. [6825

HARLEY-DAVIDSON 1915 Combination, new sidecar, fully equipped, spares, tools, tyres unpunctured, perfect condition; first comer £58; no letters.—6, Lorenzo St., Pentonville Rd., King's Cross. [6840

GET IT AT TAYLORS

"A Happy New Year to our Friends at Home and at the Front."

We feel it opportune to send a few extracts from letters received from our clients at Home, from the Front, the Navy, and the Colonies during the past year.

We trust it will help to promote confidence to "GET IT AT TAYLORS."

Tidworth,
30th September, 1916.

Sirs,—I have to thank you for the prompt reply and supply of goods. You are the first motor accessory supply firm that I have as yet found who take the trouble to reply per return.

Here, away from all sources of supply, it is highly desirable to be able to get certain types of accessories per return.

I want three more of your catalogues—two for colleagues and one for this mess. Six or eight of us have machines.

Hendon,
22nd December, 1916.

Dear Mr. Taylor,—Many thanks for your letter enclosing account and for getting the chassis off so promptly. It is a pleasure to deal with a firm where promises are kept in these times.—H.B.

B.E.F.,
15th June, 1916.

The wheel arrived safely and promptly, for which I thank you. Your firm is the only one which seems to consider the interests of their customers, and your promptness in carrying out orders makes it a pleasure to deal with you.

Yours faithfully,
Major ———

Sturminster Newton,
27th July, 1916.

The speedometer is now working satisfactorily. In conclusion, may I express my keen appreciation of the very impartial manner you have dealt with this matter.

May you enjoy all the success you deserve, as firms such as yours are not to be met every day of the week; in fact, one in a lifetime is all one gets, and then they consider themselves lucky.

Again thanking you, and no doubt we shall do business in the future.

Yours faithfully,
C.S.T.

S. Africa,
5th June, 1915.

Dear Sirs,—The goods arrived in good order and condition, for which many thanks.

I am particularly pleased with the mechanical horn. It is strong, and has a fine note of warning—not jarring to the nerves, as is usual with other makes.

Yours faithfully,
C.H.H.

S. Africa,
11th September, 1916.

I am well pleased with the mechanical horn and Marvel vulcaniser received a few months ago.

Yours faithfully,
C.H.H.

Grand Fleet,
19th January, 1916.

Dear Sirs,—Goods received from you very satisfactory and on top line. Lamp arrived safe, with postal order covering balance.

I remain,
Yours truly,
G.S.B.L.

H. TAYLOR & CO., LTD.

Showrooms: 21a, STORE STREET, W.C.

Wholesale: 38, ALFRED PLACE, W.C.

Garage: 12, Tottenham Mews, W.C.

'Phone—Museum, 1240.

Telegrams—"Dynametro, Westcent, London."

MOTOR CYCLES FOR SALE.

Harley-Davidson.

LATE 1916 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0861

HARLEY-DAVIDSON 1916 Models delivered from stock on the best terms for cash, exchange, or deferred payments. Sidecars in stock to fit.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0552

HARLEY-DAVIDSON, late 1915, full electric equipment, disc wheels, special semi T.T. bars, Swan touring sidecar, just overhauled, not done 2,600; any trial; £90, offers considered.—Write or call, W. Manley, 62, Albert Hall Mansions, London, S.W. [6808

RIDER TROWARD, 78, High St., Hampstead.—1916 Harley-Davidson coachbuilt combination, cost over £100, mileage 500, 79 gns.; ditto, with dynamo lighting, mileage 100, unscratched, indistinguishable from new, cost £120, 95 gns. [6962

HARLEY-DAVIDSON 1916 Model 16F and Canoelet car, wind screen, big F.R.S. lamp, Stewart horn, ridden 600 to 700 miles approximately, really good thing, £89/10; and 1916 model 16F, electrically equipped, with genuine H.D. sidecar, Cowey speedometer, ridden 900 miles only, £92/10; very good thing; deferred payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169, and Hornsey 1956. [6879

HARLEY-DAVIDSON, special New Year bargains for cash buyers.—Brand new model 11F, 7-9h.p., 3-speed, makers' present list price £93, our price £75 cash; also model 11J, 7-9h.p., 3-speed, with dynamo electric lighting outfit, makers' present list price £102, our price £80 cash. These machines are brand new, not shop-soiled, and not yet unpacked from makers' cases. The number is limited, and early application is necessary to secure delivery at these prices. Gloria sidecar, enamelled to match, £20; Gloria Model de Luxe, with spring wheel, £25; Montgomery American model, £16.—The Premier Motor Co., Aston Rd., Birmingham. [6845

Hazlewood.

HAZLEWOOD, 2¾h.p. J.A.P., 3-speed, free engine and clutch, 1916 carburetter, recently overhauled, new piston and bushes fitted, trip mileometer, mechanical horn, tools, etc.; any trial; £19, or nearest offer; called up.—Unstead, 11, St. Andrew St., Bethnal Green. [X3916

Henderson.

RIDER TROWARD, 78, High St., Hampstead.—1915 Henderson, Bramble 20 gn. underslung coachbuilt sidecar, dynamo lighting, mileage 2,000, indistinguishable from new, cost £112; 85 gns. [6964

Hobart.

1914 2¾h.p. Hobart, Sturmey-Archer 3-speed, excellent condition; £20.—Clayson, 27, Bridge St., Northampton. [X4136

Humber.

HUMBER, 2¾h.p., and sidecar; £7/10; must sell.—Mallory, Sherburn, York. [6833

1914 3½h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863

1912 2-speed Humber, £18/10; new Middleton wicker sidecar, £4/10.—Mosedale, 30, Canterbury Rd., Kilburn. [6770

1913-14 3½h.p. Humber, Roc improved 2-speed gear, decompressor, and sidecar; £28.—80, Bispham Rd., Southport. [X4101

HUMBER, 1914, 6h.p., water-cooled, 3-speed, Mills-Fulford sidecar, lamps, and horn complete, splendid condition; £85.—Fryers, Hereford. [X4053

HUMBER, 3½h.p., well kept, perfect order, reliable; £19, reasonable offer not refused; after 8 o'clock, —17, Michigan Av., Manor Park. [X4093

HUMBER Combination, 3½h.p., 2-speed, free, mag., B. and B., fast, in fine order and condition; £18 —Head, 31, Hamthorpe Rd., West Norwood. [0870

HUMBER, 1915, 3½h.p., 3-speed, nearly new; special price, £57/10.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0842

HUMBER, 3½h.p., 1911, 2-speed, handle start, Cowey speedometer, coach sidecar, wind screen, spares, excellent condition; trial; £25/10; seen Sunday, or by appointment. 'Phone: Hop. 624.—149, Links Rd., Tooting Junction. [X4056

1917 3½h.p. Humber, twin horizontal engine, semi-T.T. bars, handle-bar controlled clutch, quite new, just delivered, £75; with Mills-Fulford coach sidecar complete, £88; Douglas machines taken in part exchange.—Robinson's Garage, Green St., Cambridge. [7056

Indian.

1915 Indian, 5h.p., 3-speed, K.S., like new; £46.—Ross, 86, High Rd., Lee. [6785

7h.p. Indian Combination; £38; exchange lightweight. —Brown, 96, Phœnix St., West Bromwich. [X4081

INDIAN, 7-9h.p., 1914, 2 speeds, spring forks, electric horn, tyres excellent; £30.—Cleverlys, Oxted [6810

MODEL G 1916 Indian and Phœnix Sidecar, very little used; £75.—Chilton, High St., Watford. [6994

1914 7-9h.p. T.T. Indian Combination, clutch, disc wheels; £30.—Clough, New Hall Hey, Rawtenstall. [6772

LATE 1915 5-6h.p. Indian, fitted with Canoelet sidecar, grand condition; £55.—Lewis, 61, Loudon Rd., Twickenham. [6828

MOTOR CYCLES FOR SALE.

Indian.

1914½ 7-9h.p. Indian Combination, electrically equipped, and guaranteed perfect; £45.—20, Whitley St., Reading. [7109

INDIAN, 1915, 3½h.p., 3 speeds, clutch, kick starter, and sporting sidecar; £48, or near offer.—Locke, c/o Clayton's Garage, Wallington, Surrey. [7024

1916 T.T. Indian Powerplus, 3-speed, and accessories, in good condition; seen any time; £57/10.—Bounds, Garage, 223, High Rd., Kilburn. [6897

INDIANS.—1915 7h.p. 3-speed De Luxe combination, £58; 5h.p., 3 speeds, coach torpedo sidecar, 50 gns.—P. J. Evans, John Bright St., Birmingham. [X4165

INDIAN 1915 6h.p. Combination, 3-speed, kick start, clutch, as new; going away; must sell; £58, no offers.—Lieutenant, Foxwarren Park, Cobham, Surrey. [6773

INDIAN, 7-9h.p. (1914), good as new, little used; owner at Front; will be sold by auction January 16th, 1917.—Charles Muskett, 88, Station Rd., New Southgate, N. [6621

INDIAN, 7-9h.p., clutch, kick starter, all accessories, in new condition; £38; or with coachbuilt sidecar and P. and H. lighting set, £45, no offer.—King, 73, Hill St., Peckham. [7097

1916 (Aug.) 5h.p. Indian and 16 gn. sidecar, 3 speeds, kick start, run 1,000 miles, and in brand new condition, runs beautifully; £68, no offers.—Box 618, c/o *The Motor Cycle.* [X4200

INDIAN, late 1914, 7-9h.p., spring frame, 35 gn. Gloria Projectile sidecar, electric lighting, speedometer, spares, perfect condition, smart turnout; photo; £65, bargain.—60, Wright St., Horwich, Lancs. [6818

1916 7-9h.p. Indian Powerplus de Luxe Combination, mag., dynamo electric lighting set and horn, new condition, used few trial runs only; cost £111, sacrifice £95, or exchange Ford car.—67, Far Gosford St., Coventry. [X4095

INDIAN, late 1916 Powerplus, 3 speeds, clutch, kick starter, accessories, sporting coachbuilt sidecar, all disc wheels, fast, excellent condition; any trial; very sporting turnout; £65; letters only.—Invalided, Hardwicke, Lindfield, Sussex. [6858

INDIAN, 1916 models in stock. I have a few model C's left, £78; specification includes 7-9h.p., 3 speeds, countershaft, clutch, and kick starter, spriug irame, and electric lamps and horn, £78.—P. J. Evans, John Bright St., Birmingham. [X4167

INDIAN 1916 5h.p. Twin, T.T. model, 3-speed, kick starter, 26×3in. heavy Dunlop tyres, Stewart speedometer, and mechanical horn, all tools, very fast machine, in excellent condition; £55.—The Premier Motor Co., Aston Rd., Birmingham. [6846

1916 (Aug.) 7-9h.p. Powerplus Indian, Millford sidecar, dynamo lighting, 3 lamps, electric horn, spring frame, 3 speeds, speedometer, Dunlops unpunctured, only done 1,800, as new; best offer over £80; owner going overseas; seen any time.—Box L2,888, c/o *The Motor Cycle.* [6813

Ivy.

RIDER TROWARD, 78, High St., Hampstead.—1915 Ivy, 2-speed, 2-stroke, perfect; 24 gns. [6969

IVY, 1915, 2-stroke, 2-speed, perfect condition, lamps, horn, etc.; £30.—H. Brown, 31, Lithos Rd., Finchley Rd., Hampstead. [6856

James.

JAMES 1915 3½h.p. Twin, 3-speed countershaft, lamp, and horn, little used; £52.—Fryers, Hereford. [X4052

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803

1916 4¼h.p. James Combination, used for demonstration runs; £70.—Parker and Son, St. Ives, Hunts. [7041

JAMES 4¼h.p. Combination, new coachbuilt sidecar, 3-speed countershaft, speedometer; £37/10.—Boyce, 27, Turnpike Lane, Horsey. [6905

1911 James, 3½h.p., free engine, new belt and tyres, splendid order, spring frame; £15.—Wallis, 7, Lower Hillmorton Rd., Rugby. [X4010

JAMES Lightweight, 1915, 2½h.p., 2-stroke, had very little use, and equal to new; £28 cash.—The Premier Motor Co., Aston Rd., Birmingham. [6847

JAMES 1914 4¼h.p. Coach Combination, countershaft gear, and accessories, £44/10; also 1915 model, £56/10.—Motor Exchange, Horton St., Halifax. [6667

JAMES, 1917 model, for immediate delivery from stock. Big four combinations, with and without Lucas dynamo lighting set; 3½h.p. twin, and 2-stroke models.—P. J. Evans, John Bright St., Birmingham. [X4168

J.E.S.

J.E.S. Lightweight, Amac carburetter, Lycett saddle, good condition, recently overhauled; £12.—Lavender, Gedney Hill, Wisbech. [7026

J.H.

1915 J.H., M.A.G. 2-cyl. engine, 3-speed, mileage about 600, good condition; cost £65.—Speer, Powyscourt, Balcombe, Sussex. [6838

1916 J.H., 6h.p. M.A.G. engine, 3-speed Sturmey-Archer countershaft gear box, h.b.c. clutch, Binks carburetter, all in grand condition, and as new, very fast; £50.—Jones, Garage, Broadway, Muswell Hill. [7094

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GRAND BARGAINS.

Few can equal our great selection for Number, Value, Variety, and Low Price in the most sought after New Models and perfect Second-hands that save buyers many pounds and give unsurpassable satisfaction for unique value and completely satisfactory riding condition.

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BIG SHOW OF NEWEST MODELS.

Fully detailed Lists sent free, including:

	ALLDAYS ALLON, 2-stroke, 2-speed ...	£44	17 9
	ALLDAYS ALLON, 2-stroke, 2-sp., clutch	£48	0 9
6 h.p.	**ENFIELD** Combination, 2-seat. Sc.	£102	0
7 h.p.	**INDIAN,** Model G, 3-speed	£75	0
4-5h.p.	**ZENITH,** Model D	£73	18
2¼ h.p.	**LEVIS,** 2-stroke, Popular model ..	£32	0
2½ h.p.	**NEW IMPERIAL,** 2-speed, k/start	£48	8
2¼ h.p.	**NEW IMPERIAL,** 2-speed, Model I	£40	19
2¼ h.p.	**CALTHORPE,** 2-stroke, 2-speed ..	£34	13
2½ h.p.	**CALTHORPE-J.A.P.,** 2-speed	£39	18
2½ h.p.	**LEVIS,** 2-sp., Model E, chain drive	£47	10
2½ h.p.	**SPARKBROOK,** 2-stroke, 2-speed.	£40	0
5 h.p.	**CLYNO,** Military Model, with Sidecar, spare wheel, and luggage grid ...	£108	3
6 h.p.	**ENFIELD** Combination, elec. equip.	£110	5
2¼ h.p.	**ENFIELD,** 2-stroke, 2-speed	£44	2
7 h.p.	**INDIAN,** Model C, 3-speed	£78	0
3½ h.p.	**ENFIELD,** Model 140	£57	15
5 h.p.	**INDIAN,** Model B, 3-speed	£70	0
4¼ h.p.	**B.S.A.,** Model H	£66	0
4¼ h.p.	**B.S.A.,** Model K	£64	0
2¼ h.p.	**DIAMOND-J.A.P.,** Enfield 2-sp gear	£40	19
2½ h.p.	**O.K. JUNIOR-J.A.P.,** 2-speed	£38	0
2¼ h.p.	**EXCELSIOR,** 2-stroke, 2-speed ...	£39	5
2¼ h.p.	**EXCELSIOR,** 2-stroke, single gear.	£30	16
2¾ h.p.	**EXCELSIOR,** lady's model	£46	10
2½ h.p.	**SPARKBROOK,** 2-stroke, 2-speed.	£40	0

AT OUR GLASGOW HOUSE.

All above New Models and a big show of Second-hands, including many almost new. Full Lists free, including:

1916 4 h.p.	**CALTHORPE** Com., 2-sp., F.E.	£60	0
1915 6 h.p.	**CLYNO** Com., complete equip.	£65	0
1915 6 h.p.	**ENFIELD** Com., dyn. lighting	£75	0
4 h.p.	**PREMIER,** twin, 2-sp., and Sidecar	£26	0
1916 7 h.p.	**INDIAN** & Sc., Mod. C, as new	£68	0
1914 6 h.p.	**MATCHLESS-J.A.P.** and S'car	£44	0
1916	**AUTO-WHEEL,** with Raleigh 2-speed	£15	0
8 h.p.	**HUMBERETTE,** complete, perfect, full equipment. Special	£88	0

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All above New Models and Scotland's biggest show of thoroughly reliable Second-hands, all perfect, and many as new. Full Lists free, including:

1915 2½ h.p.	**ROYAL RUBY,** 2-str., Villiers engine	£21	0
1915 2¼ h.p.	**CALTHORPE,** 2-stroke	£21	0
1913 3½ h.p.	**B.S.A.,** belt drive, 2-sp., F.E.	£25	0
1913 3½ h.p.	**ROVER,** 3-speed, Lucas head lamp, generator, horn, speedometer..	£27	0
1913 3½ h.p.	**RUDGE** Multi, lamp and horn	£35	0
1914 7 h.p.	**INDIAN,** spring frame, 2-sp., with Gloria coach Sidecar, full equip.	£42	0
1917 5-6h.p.	**CLYNO** Com., 3-sp., kick, war khaki finish, interchangeable wheels, spare and tyre, head and rear lamps, 2 generators, horn, carrier, only used few miles; cost £114; as new	£95	0
1914 2¾ h.p.	**DOUGLAS,** T.T., speedometer and accessories	£35	0
1916 2¾ h.p.	**EXCELSIOR,** 2-stroke, 2-sp..	£39	0
6 h.p.	**BRADBURY,** 3-speed, and Sidecar.	£43	10
1916 2¼ h.p.	**INDIAN,** used only 50 miles.	£44	0
1915 2¾ h.p.	**DOUGLAS,** Model U, 2-speed	£46	0
1914 4¼ h.p.	**B.S.A.,** with torpedo Sidecar.	£48	10
1916 4¼ h.p.	**B.S.A.,** 3-speed, coach Sidecar	£63	0
1915 7 h.p.	**INDIAN,** spring frame, and Indian Sidecar	£58	10

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272-274, GT. WESTERN RD., GLASGOW.

MOTOR CYCLES FOR SALE.

Kerry.

KERRY, 2½h.p., going order; £4/10.—53, Clive Rd., West Dulwich. [X4099

2¾h.p. Kerry, less battery, engine like new, vertical; £5.—80, Bispham Rd., Southport. [X4100

KERRY, 2¾h.p.; owner called up; £9, offer; must sell.—Clement, 2, Windsor Rd., Camberwell. [7048

KERRY-ABINGDON, 5h.p., 3-speed, etc., perfect, and fully equipped, and fitted with a new Mills-Fulford coachbuilt sidecar; £35.—Smith, 199b, King St., Hammersmith. [6998

Levis.

LEVIS, latest, braud new, single and 2-speed models in stock.—Moss, Wem. [X4191

LEVIS, just overhauled; £16/10.—Kink, 52, Brodrick Rd., Wandsworth Common. [6901

LEVIS, 1915, new condition, very fast; £22, or near offer.—45, Hurst Grove, Bedford. [X4037

LEVIS Baby, 2¼h.p., perfect; £20.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6593

1916 Levis, month old, perfect throughout; 25 gns.—245, Hammersmith Rd., London, W. [6909

1916 Levis, perfect condition, hardly used, lamps, horn, etc.—Ray, 10, Elms Buildings, Eastbourne. [8805

RIDER TROWARD, 78, High St., Hampstead.—Levis Popular, 1915, mileage 2,000, perfect; 19 gns. [6973

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804

1916 2¾h.p. Levis, as new, under 200 miles, complete; £40.—Tucker, Clunes, Four Oaks, Birmingham. [X4124

LEVIS, 2-stroke, excellent running order, Bosch mag., T.T. bars; £12/10, lowest.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [6983

Lincoln-Elk.

RIDER TROWARD, 78, High St., Hampstead.—1915 Lincoln Elk, 4¼h.p., 2-speed countershaft gear, hand clutch, kick-start, powerful sidecar or solo machine, mileage 5,000; 29 gns. [6966

1914 Lincoln-Elk, 3h.p., clutch, excellent condition, complete with lamps, horn, etc., Bosch mag., nearly new Palmer tyres; special bargain to clear, £16/10; exchanges.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [6981

L.M.C.

RIDER TROWARD, 78, High St., Hampstead.—1912 L.M.C., 3½h.p., very good order; 12 gns.; bargain. [6976

Lugton.

RIDER TROWARD, 78, High St., Hampstead.—Lugton-Precision, 1914, 4h.p., T.T. clutch model, good order; 21 gns. [6972

Matchless.

MATCHLESS, 4h.p., 2-speed, T.T. bars; £30; combination wanted.—S.G., Oakhurst, Eastrop, Basingstoke. [6779

6h.p. Matchless and Millford sidecar, complete lamps, horn, numbers, etc.; £44.—Cross, Effingham Sq., Rotherham. [X4157

MATCHLESS 6h.p. 2-speed Coach Combination; £42/10, or exchange.—Motor Exchange, Horton St., Halifax. [6868

MATCHLESS-J.A.P. Combination, 8h.p., 1915, 3 speeds, speedometer, Lucas lamps, Low generator, new tyres, excellent condition; £75.—Box 614, c/o *The Motor Cycle.* [X4086

Minerva.

MINERVA 5h.p. Twin, very powerful and fast; £15, or cycle in part; appointment.—4, Roupell Buildings, Brixton Hill, S.W. [6794

Motosacoche.

1914 Motosacoche, 2½h.p., single speed, Bosch, new Avons; £12.—Wright, 185, Silverdale Rd., Tunbridge Wells. [6865

New Hudson.

1916 2¼h.p. 2-stroke 2-speed New Hudson Lightweight, slightly shop-soiled; £33 cash.—Manby, Kirkgate, Wakefield. [X4114

NEW Hudson, 2¼h.p., 2-speed, 2-stroke; £38.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0840

1913 3-speed New Hudson and sidecar, all in perfect order and condition, all lamps, etc.; £30.—Jones, Garage, Broadway, Muswell Hill. [7087

NEW Hudson 1912-13 3½h.p. Combination, 3 speeds, clutch and starter, good condition, £28; 1912 combination, £22.—P. J. Evans, John Bright St., Birmingham. [X4164

NEW Hudson Big Six Combination, C.B., countershaft, clutch, 3-speed, speedometer, lamps, etc., perfect condition; trial arranged.—13, St. Swithins, Winchester. [X4206

1915 4h.p. New Hudson and Sidecar, 3-speed countershaft gear box, all in splendid order and condition, all lamps, etc.; £52; deferred payments arranged.—Jones, Garage, Broadway, Muswell Hill. [7088

NEW Hudson, 1912-13, 3½h.p., 3-speed, clutch, kick start, gears just overhauled at cost £6 by specialist, B. and B. Bosch, new belt and spare, dropped footrests, semi T.T., long exhaust; £26/10.—Brown, 4, Grove Gardens, Isleworth. [7016

MOTOR CYCLES FOR SALE.

New Imperial.

1914-15 Imperial-Jap, 2½h.p., 2-speed; £24.—Ross, 86, High Rd., Lee. [6787

NEW Imperial, latest 2½h.p. and 6h.p. models in stock.—Crow Bros., Guildford. [6367

1917 New Imperial Lightweight, 2 speeds; 39 gns.—Motor Exchange, Horton St., Halifax. [6670

COLMORE Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0805

1915 New Imperial-Jap, in fine order, complete, lamps, etc.; £25.—Cross, Jeweller, Rotherham. [X4155

NEW Imperial, almost new, not ridden 200 miles, fully equipped; what offers?—S. Alderton, 426, Strand, W.C. [6893

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for Imperial-Jap, the finest lightweight on the market; delivery from stock. [6246

BIRMINGHAM Agent, P. J. Evans, John Bright St. —1917 New Imperial models in stock for immediate delivery; 2¾h.p. 2-speed models, 38 gns.; also clutch models for light sidecar work. [X4194

1916 New Imperial, new September, 2 speeds, 2 lamps (P. and H.), 2 generators, horn, spares, spare tank, vaporiser, perfect condition, ridden 600 miles; £32.—79, Clarence Rd., St. Albans. [X4059

Norton.

1914 T.T. Norton, Brooklands special, 1916 Philipson, all accessories; £38.—Lieut. Stansbie, 14, Montpelier Row, Blackheath. [6809

1915 Norton, T.T., Philipson pulley, not been used in 1916, absolutely like new, very fast; what offers?—Hick, Sherburn, York. [6834

NORTON, 1914, Big Four, complete with Bowser 2-seat C.B. sidecar, lamp, horn, etc., almost new condition throughout, owner on service; offers wanted.—Layton's Garage, Bicester, Oxon. [7072

NORTON, 1916½, 3½h.p., T.T., 3-speed countershaft, with Norton sporting sidecar, lamps, horn, etc.; 70 gns.; consider 2¾h.p. Douglas part exchange.—C/o Smith, Clifford House, Holmer St., Hereford. [X4119

NORTON Big 4 Combination, in very fine order, luggage grid, petrol tin carrier, sidecar brake (Mr. Norton's demonstration machine, as illustrated in catalogue), belt drive, 3-speed Sturmey hub, 3in. tyres; £55. —Wallis, Motors, Hereford. [6871

N.S.U.

N.S.U., 3h.p., 2-speed, £14/10; 3½h.p., 2 speeds, £17/10; bargain prices.—Motor Exchange, Horton St., Halifax. [6669

1913 3h.p. N.S.U., wants slight overhaul, only wants seeing, 2-speed, etc., guaranteed nothing broken or worn out; a bargain, £13/10.—Jones, Garage, Broadway, Muswell Hill. [7089

RARE Bargain.—1913 3h.p. twin N.S.U., 2 speeds, new tyres and belt, splendid condition, very fast and powerful, guaranteed perfect, all accessories; only £14.—Brown, Gloucester Rd., Chesterfield. [X4135

O K

O.K.'s in stock, M.A.G. £42/10, J.A.P. £38.—Yonngs, 2 and 3, The Parade, High Rd., Kilburn [5931

O.K. Junior, late 1915, J.A.P. 2½h.p., 2-speed, lamps, accessories, very little used; £23.—Davis, Acacia, Coleman Rd., Belvedere. [X4084

O.K., 1916, 4-stroke, 2-speed, countershaft, elaborate accessories, spares, and tools, as new; £25.—Head, 31, Hainthorpe Rd., West Norwood [0867

1914 O.K., 4-stroke, 2-speeds, engine and gears in splendid condition, tyres unpunctured, 100 m.p.g.; £16, lowest.—Richardson, 298, Fulham Rd., S.W. [6918

O.K. Junior, Mark VI., 2-speed countershaft, splendid condition, delivered from works June 3rd, 1916, very little used for 3 months; £30/10, no offers.—Hooper, Castle Works, Mere, Wilts. [6799

P. and M

P. and M., 1913, 3½h.p. coachbuilt combination; £40.—Tuke and Bell, Ltd., Motor Dept., Carlton Engineering Works, High Rd., Tottenham, N. [4916

1912 3½h.p. P. and M., 2-speed, kick starter model, and coachbuilt sidecar, new tyres, splendid running order; £28 cash.—Manby, Kirkgate, Wakefield. [X4115

Peugeot.

5-6h.p. Twin Peugeot, Bosch, B. and B., free engine, Pillion, sidecar, overhauled; £25; owner joined up.—Purser, 331, Wick Rd., Hackney Wick. [6912

Premier.

PREMIER, 3½h.p., fully equipped, just overhauled; bargain, £22.—52, Elm Grove, Southsea. [6826

PREMIER, 1912, 3½h.p., 2 speeds; £21/10, or with sidecar £25/10.—Motor Exchange, Horton St., Halifax. [6671

1914 3½h.p. Premier, 2 speeds, coachbuilt sidecar; £45; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0823

1914 Premier, 3½h.p., 3-speed countershaft gear box, and sidecar, very comfortable machine, been perfectly kept in splendid order and condition; £47; deferred payments arranged.—Jones, Garage, Broadway, Muswell Hill. [7091

SECOND-HANDS.

6 h.p. **ENFIELD** 1916 Com., speedometer, hood, screen	£85	0
6 h.p. **ENFIELD** 1916 Com., scarcely used, and accessories	£85	0
3½ h.p. **P. & M.**, 1914, and P. & M. coach Sidecar, perfect condition	£55	0
2¼ h.p. **CONNAUGHT**, 1916, only shop-soiled, lamp, horn	£29	10
2½ h.p. **RADCO**, 1914, single-speed	£15	10
2¾ h.p. **DOUGLAS**, 1914, 2-sp., excellent order	£44	10
2½ h.p. **JAMES**, 1915, 2-sp., new tyres, accessories	£25	10
4 h.p. **TRIUMPH**, 1914, 3-sp., and Swan Sidecar, heap accessories	£49	10
6 h.p. **MATCHLESS**, 1912, 2-sp., and coach Sidecar	£29	10
3½ h.p. **HUMBER**, 1912, 2-sp., and Sidecar, many accessories	£25	10
4½ h.p. **B.S.A.**, model H, 1916, Swan Sidecar, hood, Lucas 70/- lamp, Miller's tail lamp, Lucas horn, Stewart speedometer	£68	10
3½ h.p. **ROVER**, 1913, T.T. model, all access., long exhaust pipe, 2 lamps	£32	10
2½ h.p. **ALLDAYS ALLON**, 2-sp., clutch model, all accessories	£36	10
2½ h.p. **NEW HUDSON**, late 1914, 2-sp.	£23	10
2¾ h.p. **A.J.S.**, 1915, 2-sp., k.-start, hand clutch, new tyres	£44	10
2½ h.p. **COVENTRY EAGLE**, 2-sp., 2-str., superior finish, special price	£39	10
2½ h.p. **JUNO-VILLIERS**, 1916, mileage about 100, accessories	£33	10
4½ h.p. **B.S.A.**, model H, and Phœnix Sidecar, screen, mileage 700	£68	10
7-9 h.p. **HARLEY-DAVIDSON**, mod. 16F, and Canoelet Sidecar, big F.R.S. set	£89	10
3 h.p. **ENFIELD**, 2-sp., k/start, ridden 1,500 miles only	£43	10
3 h.p. **ENFIELD**, 1915, 2-sp., T.T. handlebars, mileage 1,000	£43	10
3 h.p. **ENFIELD**, 1916, 2-sp., k/start, Standard equipment	£45	10
7 h.p. **MATCHLESS**, 1914, model 8B, and new Canoelet Matchless Sidecar, and accessories, splendid condition	£73	10
3 h.p. **ROVER**, dry battery ignition	£7	10
2¾ h.p. **CALTHORPE-J.A.P.**, 2-sp., and accessories, ridden about 400 miles	£35	10
7-9 h.p **HARLEY-DAVIDSON**, mod. 16F, 1916, elec. equip., mileage 1,975, 2 sidecar lamps, speedometer, with genuine H.D. Sidecar	£92	10
6 h.p. **ENFIELD** Tradesmen's Comb., all accessories, mileage about 400	£87	10

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SAXON, 1915, 11 h.p., 2-seater, Stepney, speedometer, lamps £112 10

BELSIZE, late 1914, 10-12 h.p., Commercial Car, mileage 6,000 £185 0

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MOTOR CYCLES FOR SALE.

Premier.

PREMIER 2½h.p. Lightweight, late model, complete and little used; accept £20.—Layton's Garage, Bicester, Oxon. [7073

RIDER TROWARD, 78, High St., Hampstead.—1914 Premier, 2-speed countershaft gear, 3½h.p., good order; 27 gns. [6970

1914 Premier, 2½h.p., 3-speed, clutch, all accessories; £24.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [7053

1913 3½h.p. Premier, new tyres, tubes, belt, engine excellent order; £19/10.—D. Geary, 76, Fife St., Wincobank, Sheffield. [X4116

1912 Premier Motor Cycle and Sidecar, 3½h.p., 2-speed, free engine, kick start; £28.—Corrie, 84, Claylands Rd., Clapham, S.W. [6916

CHEAPEST Bargain ever offered.—4h.p. twin Premier, 1913, clutch model, overhead valves, new tyres and belt, just overhauled by makers, condition throughout as new, £8 worth accessories on handle-bars; accept £24, or with 10 gn. Millford all cane sidecar (as new), £30.—Amber House, Gloucester Rd., Chesterfield. [X4134

Quadrant.

QUADRANT, 3½h.p., Bosch, B. and B., spring forks, good tyres; £12.—Bromley, Appledore Station, Kent. [X4204

QUADRANT, 3½h.p., spring forks, mag.; good tyres and belt, good order, and fast; £12.—14, Dodbrooke Rd., West Norwood. [0872

QUADRANT, 1912, 4h.p., 2-speed, and sidecar, £29/10; 1913 7-9h.p., countershaft gear, chain drive, coach sidecar, £45/10.—Motor Exchange, Horton St., Halifax. [6673

Radco

RADCO, 1916, countershaft 2-speed, mileage under 200, like new, fully equipped; bargain, 25 gns.; must sell.—136, Dalmally Rd., Croydon. [6928

Regal.

REGAL Precision, 2¾h.p. T.T. model, Kempshall tyres, first-class condition; £16/10.—21, Fulham Rd., Sparkhill, Birmingham. [X4199

Rex.

REX 6h.p. Twin, Bosch, free engine, B. and B., spring forks; bargain, £10/10.—Lornie, Alyth. [X4173

REX, 3½h.p., sound throughout, good tyres; £5, no offers; worth double.—14, Dodbrooke Rd., West Norwood. [0879

REX, 3½h.p., mag., spring forks, re-enamelled, good tyres, in good order; £10.—Head, 31, Hainthorpe Rd., West Norwood. [0869

REX 5-6h.p. Combination, Bosch, 2-speed, handle starting, excellent condition, Carrol coach sidecar; £19/10.—Stanworth, Old Tong Fold, Bacup. [X4207

REX, 5h.p., underslung sidecar, waterproof mag., Amac carburetter, belt and tyres nearly new, in perfect running order; offers.—58, Tranmere Rd., Earlsfield. [6892

REX 5-6h.p. Twin Combination, 2 speeds, free, handle start, Bosch, B. and B., nearly new tyres, spare valves; trial run; £23, no offers.—Ridehalgh, Inkerman St., Bacup. [6993

REX, 1913, bought June, 1914, 6h.p. twin combination, 3-speed, kick starter, coachbuilt sidecar, complete with lamps, tools, etc.; £40.—Firth's, Woodbridge Rd., Moseley, Birmingham. [X4198

REX 7h.p. Twin, handle starting, £23/10; 1913 6h.p. 2-speed Rex Sidette, £36/10; 3½h.p. mag. model, £14/10; 5½h.p. twin, £15/10.—Motor Exchange, Horton St., Halifax. [6674

3½h.p. Rex and Sidecar, B. and B., Bosch, Dunlop 3½ in. belt, 2-speed, free, kick start, nearly new tyres and tubes, lamps, horn, mirror, toolbags, good running order; trial; £25 cash.—Harding, Acomb, York. [X4058

Rover.

ROVER, new 1917 latest combinations, solo, and T.T. models in stock.—Moss, Wem. [X4192

ROVER, 1914, 3½h.p., 3-speed, lamps and horn, semi ... bars, very fast; £45.—Fryers, Hereford. [X4054

1914 Rover Combination, 3-speed, lamps; accept £50, offers.—Parker and Son, St. Ives, Hunts. [7042

ROVER Combination, 3½h.p., 3 speeds, and clutch, perfect order; £45.—Piercy, 255, High St., Hounslow. [6797

ROVER.—Two new 1917 models, 3½h.p., 3-speed countershaft, complete.—Davies, Green Garage, Barmouth. [7044

ROVER 3½h.p. Clutch Model, sound but not smart; £16, bargain; must clear.—Layton's Garage, Bicester, Oxon. [7075

BIRMINGHAM Agent for Rovers, P. J. Evans, John Bright St.—1917 models in stock for immediate delivery.—See below.

1917 3½h.p. Rover Coachbuilt Combination, 3-speed countershaft gear and De Luxe sidecar; 85 gns.—Below.

1917 3½h.p. Rover, sporting model, racing or semi racing handle-bars; £56/10; extra for hand-controlled Philipson pulley, £4/10.—P. J. Evans, John Bright St., Birmingham. [X4170

MOTOR CYCLES FOR SALE.

Rover.

ROVER, 1915, nearly new, horn, lamps, tools, complete; £45.—Linging, Melview, Old Shoreham Rd., Prestonville, Brighton. [6831

ROVER, 3½h.p., T.T. special, 3-speed, and clutch, very fast, a real sporting bike; £30.—Longman Bros., King St., Acton. [7100

ROVER, T.T., 1913, perfect running condition, tyres new, fast, been taken care of; £19.—Shaw, Blonay, Westbury Rd., Woodside Park, N. [7023

ROVER, 1915, 3½h.p., 3-speed countershaft, Lucas lamp set and horn, fine condition; £47; with sidecar £5 extra.—Pike, 102a, Church St., Chelsea. [6861

ROVER.—New models in stock; 3h.p. countershaft 3-speed £69/10, also 3½b.p. with Philipson pulley, T.T. bars, £61/10; cash, exchange, or deferred payment terms quoted.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0481

ROVER, late 1914, 3½h.p., 3-speed, and clutch; this has had most careful attention, and is equal to new, straight from the original owner to us, engine completely overhauled, and a guaranteed machine; real bargain, £36.—Longman Bros., King St., Acton. [7099

Royal Ruby.

RIDER TROWARD, 78, High St., Hampstead.—Royal Ruby, 2-speed, 2-stroke; 18 gns. [6971

ROYAL Ruby, one only, brand new 1916 2¾h.p. lightweight, Villiers 2-stroke engine, Dunlop heavy rubber studded tyres; £29/10 cash, a real bargain.—The Premier Motor Co., Aston Rd., Birmingham. [6848

Rudge.

3½h.p. Rudge Multi; £60; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0864

1912 3½h.p. Rudge, free engine, good condition; £25.—R. E. Jones (Garages), Ltd., Swansea. [0785

RUDGE, 3½h.p., 1914, good condition, little used.—Curtis, Longcroft, Maple Rd., Harpenden. [X4015

RUDGE, 1912, 3½h.p., 2-speed, coach sidecar, £29/10; 1913 3½h.p. Rudge Multi, new coach sidecar, £37/10.—Motor Exchange, Horton St., Halifax. [6672

LATE 1914 Rudge Multi and sporting Bramble sidecar, lovely condition throughout, had little use; any trial; sacrifice £36; absolute gift.—Else, Dimple, Matlock. [X4131

3½h.p. Rudge Multi, F.E., clutch model, lamps, horn, mirror, all accessories, perfect condition; bargain, £26, or offer.—H. W. Warner, 136, St. Anne's Rd., South Tottenham, N. [7003

RUDGE Multi, 1916, 3½h.p., was supplied new by us June last, mileage about 1,000; it has been continually under our notice, and we can vouch for its condition; equal to new, and only a little soiled; great bargain, £42/10.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [7098

Sarolea.

5-6h.p. Sarolea, 2-speed, B. and B. carburetter, tyres good order; £10.—Bourne, Grocer, Canterbury. [X3931

Scott.

COLMORE Depots, Birmingham, and Manchester, for Scott motor cycles. [0800

SCOTT, 3¾h.p., 2-speed, new tyres and chains; sacrifice £28.—E.T., 9, Hamlet Rd., Chelmsford. [X4122

SCOTT, 2-speed, kick start, good condition; bargain, £14.—Apply after 6 p.m., 12, Roslin Rd., Acton. [X4038

SCOTT, 1911, twin engine, 3¾b.p., 2-speed, water-cooled, chain drive, good tyres, lamps, horn, tools; £25; owner under orders.—Sergeant Turner, 118, Oakridge Rd., High Wycombe. [X4096

THREE Scotts.—One 1913 T.T. 2-speed, 28 gns.; one 1913-14 T.T. 2-speed with undersling sporting sidecar, 34 gns.; one 1914-15 model, perfect, 38 gns.—Troward, 78, High St., Hampstead. [6960

3¾h.p. Late 1915 Scott and coachbuilt sidecar, de-luxe velops 6h.p., kick start, 2-speed, clutch model; cost £95; good as new, complete with accessories; £55, or near offer.—Lieut. Morten, Carwood House, Overstrand, Norfolk. [6917

Singer.

2½h.p. Singer, Bosch, h.b.c., low, good condition; £8/15.—52, Latimer Rd., Forest Gate. [6836

SINGER, 2½h.p., clutch model, sound but not smart; £18.—Layton's Garage, Bicester, Oxon. [7074

SINGER, 1913, 3½h.p., 3 speeds; coach sidecar; £33/10.—Motor Exchange, Horton St., Halifax. [6675

3½h.p. Singer, 1912, clutch model, perfect running order; £20, or nearest offer.—Donelly, 26, Valnay St., Tooting. [7038

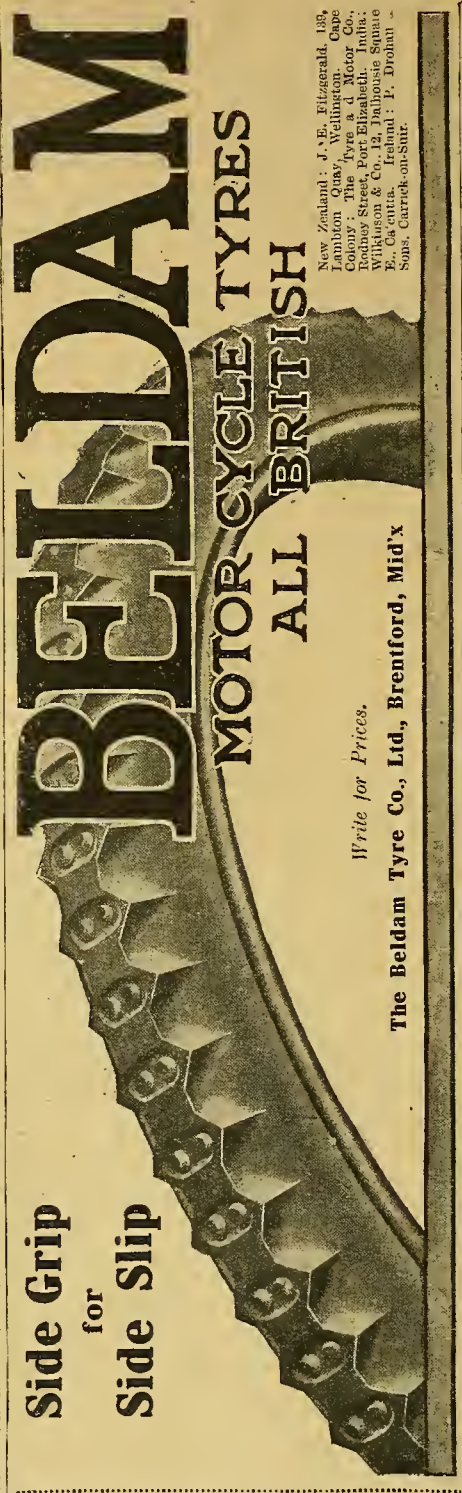
SINGER, 1914, 2¾h.p., free engine, good tyres, new belt; £19; called up.—Portlock, Terriers, High Wycombe, Bucks. [6811

RIDER TROWARD, 78, High St., Hampstead.—1913 Singer, 2½b.p., new tyres, overhauled, many accessories; 16 gns. [6965

SINGER, 2h.p., Druid forks, B. and B. carburetter, Bosch mag., M.A.G. engine, accessories, enamel and plating as new; £18.—Head, 31, Hainthorpe Rd., West Norwood. [6938

Sparkbrook.

LATEST Model Sparkbrook Lightweight, 2-speed, T.T. model. £40.—Clark and Co., Motor Engineers, Doncaster. 'Phone: 176. [6841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RIDER TROWARD, 78, High St., Hampstead.—1915 Sun-V.T.S., 2-speed, perfect; 24 gns. [6968

COLMORE Depots, Birmingham and Manchester, for delivery from stock of all models of Sun motor cycles. [0807

SUN-VILLIERS Model de Luxe, 2-stroke, absolutely new; sacrifice £25.—108, Runcorn Rd., Moseley, Birmingham. [X4063

Sunbeam.

E. KICKHAM, Stokes Croft, Bristol.—1915 3½h.p. Sunbeam, all accessories, just overhauled; a bargain, £55. [X3926

1915 3½h.p. 3-speed Sunbeam Combination, fully equipped, excellent condition; £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0862

1914 3½h.p. Sunbeam with coachbuilt sidecar, all in fine order and condition; £52/10; deferred payments or exchanges.—Jones, Garage, Broadway, Muswell Hill. [7092

1916 3½h.p. 3-speed Sunbeam, 2 Lucas lamp sets, mechanical horn, Dunlops, ridden under 1,000 miles, condition guaranteed; £75.—Robinson's Garage, Green St., Cambridge. [7059

SUNBEAM, late 1914, 6h.p., luxurious Gloria sidecar, 5 attachments, speedometer, 3 lamps, horn, watch, all exceptionally fine condition; £80, near offer; after 7.—S., 54a, Redcliffe Sq., Earl's Court. [X4148

1916 7-9h.p. M.A.G. Sunbeam Combination, very little used, in perfect condition, hood, screen, lamps, speedometer, and spare wheel and tyre; £125, or exchange.—Colmore Depot, 211, Deansgate, Manchester. [6891

SUNBEAM, 1914 (late), 6h.p., 3-speed, lamps, horn, speedometer, with Burbury sidecar, special chassis, adjustable wind screen, good condition; bargain, £82.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0492

SUNBEAM, 3½h.p., 1916, for sale, semi T.T. handlebars, new spare inner tube, lamps, speedometer, etc., very little used, perfect, Russian War Office model; will accept 70 gns. for quick sale.—Apply, J. Weiner, 32, Shaftesbury Av., W.C. [6854

3½h.p. 1915 Sunbeam and De Luxe Sidecar, fitted with Lucas lighting set, tools, a complete up-to-date combination, condition absolutely as new, including finish and mechanical parts and sidecar, handsome turnout, ready for the road, and fully guaranteed; 80 gns.—Wauchope's, 9, Shoe Lane, London. [6942

Swift.

SWIFT, 3½h.p., 1911, with light sidecar, powerful engine, excellent running order, good tyres, small mileage, decompressor, Multi pulley, accessories; £22.—Pearson, Wayside, Monmouth. [X3930

T.D.C.

3½h.p. T.D.C., with Armstrong 3-speed gear and free engine, and all latest fitments, with coachbuilt sidecar, in good condition; cheap.—46, Moss Lane, Bramhall, Chesbire. [X4121

Torpedo.

TORPEDO-PRECISION 2-speed Lightweight, recently overhauled; £16/10.—Motor Exchange, Horton St., Halifax. [6676

Triumph.

1913 Triumph and sidecar, 3-speed; £35.—Ross, 86, High Rd., Lee. [6790

TRIUMPH, 1911, clutch, nice machine; £20.—11, Luna Rd., Thornton Heath, S.E. [7027

3½h.p. Triumph, clutch model, in fine order; £20, no offers.—14, Dodbrooke Rd., W. Norwood. [0874

TRIUMPH, clutch model, 1914; first £25.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [6691

TRIUMPH Junior, equal to new condition, tyres and accessories likewise; 30 gns.—Bunting, Harrow. [6774

3½h.p. Triumph, clutch model, perfect condition; £24.—Apply by letter, Oaklea, Cheapside, Woking. [7035

TRIUMPH, 3½h.p., hand clutch, perfect condition throughout; 12 gns.—245, Hammersmith Rd., London, W. [6907

TRIUMPH, 1912, 3½h.p., clutch, excellent condition, with lightweight sidecar; £25.—Fortin, Stapleford, Cambs. [X4097

TRIUMPH, 3½h.p., 1912, plate clutch, good tyres, good order, and fast; £19.—14, Dodbrooke Rd., West Norwood. [0873

TRIUMPH, T.T., 3½h.p., late 1910, with Lucas lamps; £19/10.—Bentley, Medcalf Rd., Enfield Lock, Middlesex. [X4089

BABY Triumph, very good condition, engine just overhauled by makers, lamps, etc.; £32.—Bull, St. Giles' Sq., Northampton. [X4130

1908 Triumph, 3½h.p., Bosch, B. and B., grand order; ride reasonable distance; £15.—Howe, 9, Broughton Rd., Ipswich. [6798

TRIUMPH, 3½b.p., 1912, free engine, perfect condition, £24; sidecar, £3/10; appointment only.—21a, Broadway, Stamford Hill. [7017

LATE 1914 3-speed Triumph, with Montgomery sidecar, fully equipped, and as new, done 2,000; £47/10.—20, Whitley St., Reading. [7110

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Second-hand Prices after the War.

AS is generally known, at the present time second-hand motor vehicles are commanding highly inflated figures, in many cases in excess of their original cost two years ago. These remarks apply to both the motor cycle and motor car worlds, but more forcibly still to light cars. With the prospect of a reasonably early peace, one is led to wonder how these figures will be affected when the manufacture of motor vehicles is resumed. Will prices drop suddenly and appreciably? Certainly there will be a drop in prices, but whether that drop will be considerable or not seems to depend upon the space of time it will take manufacturers to regain their normal stride. Some consider that there will be a sudden and appreciable decrease in the values of second-hand motor vehicles, but against such a possibility we have to consider that just as there will be an increased supply of motor cycles when peace returns, so also there will be a corresponding increase in the number of buyers. Which will outpace the other is the question. In this connection it may be remarked that there are thousands of men in the Army with sporting proclivities, who in many cases have a nice little sum in the bank. Their Army pay alone—which they are unable to spend by reason of their environment—will in many, many cases be more than sufficient to purchase the finest motor cycle. The temptation, increased by pent-up strain, will be for returned soldiers to enjoy themselves, and the first thought of men used to open air life is touring, or, at any rate, trips into the country.

To all such, motor cycles will make a strong appeal, and these facts, in conjunction with the great probability that it will take many months for manufacturers to reorganise their works and obtain the necessary amount of raw materials in order to resume their staple trade, will, to our mind, prevent any sudden or serious drop in the value of second-hand machines. In other words, normal peace state will not be resumed for a long time after the guns have ceased fire. One must remember, too, that one of the effects of this war has been to cause people to economise in every possible direction; thus it is extremely likely that those who formerly owned larger vehicles will be satisfied with a smaller and cheaper vehicle, and consequently all forms of economical motors will prove a distinct attraction.

Disposal of War-worn Machines.

The point we have raised is not a new one, but it vitally affects many thousands of our readers. In discussing the subject it has often been said that the anticipated release of thousands of motor vehicles by the Army will affect the issue. Government departments can, however, be relied upon not adversely to affect an industry by any rash or sweeping measures of this kind.

It is hardly likely that the war-worn vehicles which are at present rendering yeoman service to our Army will be available for distribution, even if the Government decide to dispose of them by auction, for some months after the end of the war, so that the threatened slump in second-hand values which many imagine will be produced by the sudden disposal of thousands of Army motor vehicles need not, at any rate, be expected immediately peace is declared. For one thing, transport facilities may not be such that motor vehicles can be returned immediately in any numbers, and Army decisions of this kind necessarily take time. Apart from this, is it a certainty that motorists will seize the opportunity to purchase vehicles regarding the history of which they know nothing? Keen buyers know that Army motors frequently receive gross ill-usage, and their work necessitates traversing roads and performing feats which test the parts almost to breaking point. Unrevealed strains may exist (as a correspondent points out this week) in war-worn vehicles, so that there would be a sporting risk in owning one.

An index to the advertisements in this issue will be found on the page facing the back cover.

The Tanner Force-feed Oil Pump.

An Automatic Pump Governed by Engine Speed and Throttle.

EVIDENCE is accumulating of the increasing interest taken, not only by designers but by motor cyclists in general, in a more scientific method of supplying oil to an engine. Therefore the subjoined description of a new device sent to us by the inventor, Mr. R. L. Tanner, of Lynmouth, Earlsdon Avenue, Coventry, is more than usually interesting.

In designing this pump the three principal objects aimed at were: (1.) To provide a pump that would automatically deliver oil to an engine in direct proportion to the engine speed and the throttle opening. (2.) To eliminate ball and other valves likely to give trouble, and substitute ports cut in the pump barrel and housing. (3.) To run the pump slowly enough to work satisfactorily at maximum engine speed. These objects are attained as follows:

A spring-actuated plunger A is attached to a finger B, which is raised by a spiral face cam C, rotated by the engine, and this finger is engaged by a stop D connected to the throttle by means of a Bowden cable E, so that the plunger stroke varies with the throttle opening.

The spiral face cam is formed at the side of a ratchet wheel F, actuated by a pawl G, oscillated by an eccentric H, attached to the magneto or timing gear spindle.

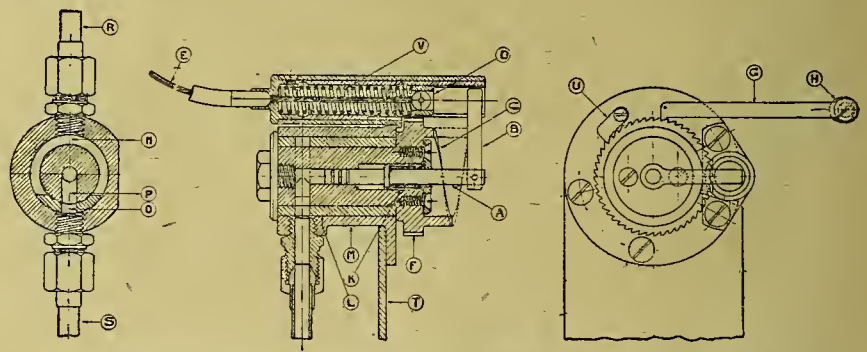
The plunger passes through the centre of the ratchet wheel, on the upper face of which is formed the spiral face cam, and upon the edge of this bears the finger of the plunger. The finger is pressed down on to the cam by a spring K, and the ratchet wheel is rotated by means of the pawl lifting the finger attached to the plunger, and then allowing it to drop rapidly under the action of its spring. The delivery is therefore forcible even when the engine is running slowly, and, owing to the gear reduction (approximately 100 to 1) obtained by the ratchet and pawl mechanism, the pump operates very slowly.

When the throttle is fully open the finger does not engage the stop, and therefore the plunger makes a full stroke. When the throttle is half closed the stop arrests the finger about half way on its delivery stroke and so on.

The barrel of the pump is formed integral with the ratchet wheel and spiral face cam, and revolves in the sleeve L, which is fixed in the housing M. In the sleeve is the suction inlet slot N and the outlet port O, and in the barrel the port P. As the barrel rotates, this latter port serves as a valve, putting the interior of the barrel into communication with the inlet R on the suction stroke of the pump plunger, and with the delivery outlet S on the return stroke. Thus the suction and the delivery are positively controlled, no automatic valves, which are liable to stick, being used.

The housing is attached to the crank case of the engine by the plate T, and two light springs (not shown in the drawing) are attached to the housing, one to the pawl G and the other to the check pawl U, the object of which is to keep these pawls in contact with the ratchet wheel.

The stop has a spring V behind it, which is sufficiently powerful, at all positions of the throttle, to resist the kick of the finger occasioned by the plunger spring.



The Tanner automatic force-feed oil pump, which raises the supply of the oil in accordance with the engine speed and throttle opening.

For convenience of drawing, the spiral face cam, finger, stop, and stop control, in the plan view, are turned through an angle of 90°, and the inlet union is omitted. The section clearly shows the relative positions of inlet and delivery unions, pump barrel, housing, and sleeve at the instant of delivery. In the plan view the position of the plunger is shown as it would appear the instant before delivery, and the stop in the position of full throttle.

The drawings depict the experimental model of the pump, but as a standard fitment it would be enclosed in the timing cover, and would be modified in several particulars.

FUTURE PETROL ALLOWANCES.

IT has been suggested that petrol allowances will ere long be further increased, but the latest announcement would suggest that this is too optimistic a view. The Petrol Committee has decided that all full duty petrol licences for motor cycle owners shall expire on March 31st. Motor cycle licences taken out this month are available for three months only; if taken in February for two months; in March for one month. The licences, originally issued for the autumn months of last year, on which some petrol remains to be purchased are still in force, and if a renewal application is made on the form on the old licence and accompanied by a five months licence fee, then a licence will be issued for the whole period.

There is no prospect of an increased allotment of fuel, though nothing definite has been decided in this direction. It is considered far more probable that the authorities will reduce the allowance.

BY IXION

Cooling the Plug.

A BIRMINGHAM reader recommends the notion of fastening a coiled spring round the base of a sparking plug which tends to overheat. The sole objection to this dodge is that the spring will have to be removed whenever the plug is taken out for any purpose, and if the spring is big enough to afford much extra cooling, it will take some wiring into position. Still, the idea is sound, and is specially suited for engines which will not take the dished cooling washers (such as the Fletcher) because there is no room to put a tube spanner on the plug. The reader in question is very pleased with the Polkey plug, a make unknown to me.

Hard Lines!

A "GENTLEMAN ranker," to use the old term, got a brief leave after a year in France, and on reaching home flew to the rather damp barn where his carefully greased single-cylinder was waiting. Nothing would induce the engine to start. An expert was called in, and soon spotted a stuck-up bell crank in the magneto contact breaker. Expert departs. Owner makes fresh efforts to start. No compression. After several hours' work it is discovered that the top piston ring is glued into its groove with carbon. Two days of an all too short leave wasted in tinkering. Amongst all our war philanthropies, we have forgotten to start a society for keeping khaki-owned motor cycles in tune against their owners' return.

A Striking Omission.

EVER since "Road Rider" started a discussion about the comparative merits of flat twins and single-cylinders, I have been waiting for some enthusiast on the big V twin to butt in; but so far I have been disappointed. After all, there are a great many men who ride the 7-9 h.p. type of machine solo, and I should have thought some of them would have been irritated by the partialities we have all been expressing for other types, especially as such preferences are really matters of individual taste, and "Road Rider" and myself have merely dared a prophecy as to which taste is likely to gain the ascendant. I have not been riding the 1,000 c.c. type of twin for several years past. My last experiments—now some years old—were not encouraging. Moreover, I dislike the weight of the big fellows; and, as I hardly ever use a sidecar, 500 c.c. usually does me pretty well. But my last long spin on a big V—a 6 h.p. Ariel—set me thinking; I thought it a pleasanter solo mount than the single-cylinder, and, if the flat twin had not proved all I expected, I had the big V twins in my mind's eye as a *pis aller*. They had not quite the perfect balance which I miss in the singles, but when you run them throttled well down on a high gear, they are charming—almost as smooth as a flat twin, and no fuss, whilst they naturally show more power, speed and acceleration than a single. Is it inevitable that the single-cylinder (failing the flat twin) should be the speedman's mount for all time? Is there any reason why some maker should not presently produce a light T.T. 5-6 h.p. twin? And if such a machine comes along, how would the single fare against it?

The Merits of the Single.

THE merits of the single-cylinder are, of course, obvious. It is at once the lightest and the simplest machine of any real power, and it affords quite as much comfort as the younger generation wants. You can decarbonise it, without scamping any detail, in an hour; and if you are a duffer, you can diagnose any petty trouble in minimum time. Simplicity is, however, a relative term, and for our purposes it means nothing more or less than the amount of trouble one must expect, and the time taken in diagnosis and repairs. On this score the single is, as yet, *facile princeps*, but the twins and the fours are fast overhauling it; before many years are past the twins will be no more troublesome or inaccessible than the single. About weight it is difficult to speak, when few catalogues are outspoken; but I imagine the single is still the lightest machine of its class, though I don't see why it should remain so. All I have written on this controversy may be tersely summed up; the "single" is the simplest and lightest machine of its power, but not the best balanced. When it has to meet competition from better balanced machines of approximately the same weight and simplicity, will it survive?

Lloyd George's One Blunder!

ONE of the most law-defying riders of my acquaintance lives in the country, and is medically unfit for military service. The local constable has been called up, and as the neighbourhood is tolerably free from serious crime, the authorities have appointed the lurid motor cyclist in question special constable for the district. Naturally, his first official act has been to abolish (silently and informally) the speed limit for that locality.

A Novel Rear Lamp.

WHEN I was examining the gadgets fitted by an enthusiastic 3 h.p. Enfield owner the other day, my eye fell on his tail lamp. He had got hold of a clip, consisting of two parallel C bands, and fastened it to his carrier. The space between the clip bands was filled with plasticine, in which were embedded a ruby glass and a small electric bulb. He claims it is the only vibration-proof tail lamp in Great Britain.

A Sixty Mile Trip along the Most Southerly Coast of Europe.

FOR many months I had been stationed at Gibraltar, and had rarely seen a motor cycle during that period, the exceptions being two or three 7-9 h.p. Indians, a 3½ h.p. Rudge Multi, and a couple of Douglases. No motor cycles from Spain appear to penetrate so far as Gibraltar, though there are a fair number of cars to be seen—especially sporting models of the Hispano-Suiza.

Imagine, then, my joy as a motor cycle enthusiast on seeing a brand new 1916 6 h.p. A.J.S. and sidecar buzzing merrily along an open stretch of road at a good 30 m.p.h. I soon found that this new importation belonged to Mr. Drew, of the E.T.C. cable ship *Amber*, and the latter gentleman lost no time in suggesting a trip to Tarifa, the most southern point in Europe, so that I might judge the paces of the A.J.S. for myself.

The A.J.S. outfit on which the journey was made.

We started early, as we wished to do a little exploring on foot, and had to be back by evening gunfire, but I soon had a taste of the speed of the A.J.S. On arriving at the Spanish Customs House in Linea, the smiling official, nodding a friendly recognition to my host, glanced at the pass and waved us through.

From here we had to make our way right round the bay to Algeciras, which lies directly opposite Gibraltar, and is connected by a service of steamers. Until a few months ago the new road to Linea had not been completed, and motorists had to leave their cars in Spain or have them hauled along the beach by mule and donkey power. Now, however, the road is roughly laid, and only waiting for the rains to set it. In England we would think it an execrable stretch of cobbles and pot-holes, but we were only too thankful for it here.

The historic town of Tarifa, showing the old fortress on the right

I, as the passenger, can vouch for the extraordinary comfort of the A.J.S. sidecar over this stretch, which we traversed at about 25 m.p.h., passing Campamento with its racecourse and polo ground, and striking a long, winding stretch of country lane inches deep in heavy white dust.

We crossed First River and Second River by elaborate iron girder bridges, and ran through two exceedingly picturesque fir tree plantations, and past quaint little roadside inns built of wood and thatch, one of which had an outside shelter covered by a thatch extended from four fir trees. We passed some Spanish infantrymen busy with a machine gun course, and, proceeding through the outskirts of Algeciras, we turned sharply to the right, where we struck the Cadiz road—a military road of wonderful engineering ingenuity and excellent surface. This road is excellently graded, and in places it winds for miles with a mountain on one side and a precipice on the other; at other points one can see it only for a few yards ahead as it winds its tortuous course between boulder and precipice. At one place the road drops very suddenly for several hundred feet, then follows a complicated S bend between two rocks. This danger point is indicated by one of the excellent Spanish road signs—a conspicuous white S on a black background.

To Tarifa.

After a steady climb of several miles from Algeciras the sea comes in view once more—a magnificent sight from this altitude, which makes the horizon appear so high that what one imagines to be sky is really sea, with the coast of Morocco across the Straits and Tangier at the water's edge. Soon after this the long descent to Tarifa begins, the little white town coming into view very suddenly between two cliffs.

Just before reaching Tarifa we stopped to take a photograph of the cemetery. The honeycomb in the far wall, which can be seen in the photograph, is used for the storage of coffins, and here they are allowed to remain as long as an annual payment is kept up. The moment these payments cease, however, the coffins are ejected and thrown on to the common heap—rather a brutal custom.

In addition to being famous as the most southern point in Europe, Tarifa is interesting for the part

In Spain with a Sidecar.—

it played in the fighting between the Moors and Spaniards, and its fortress is a magnificent old building.

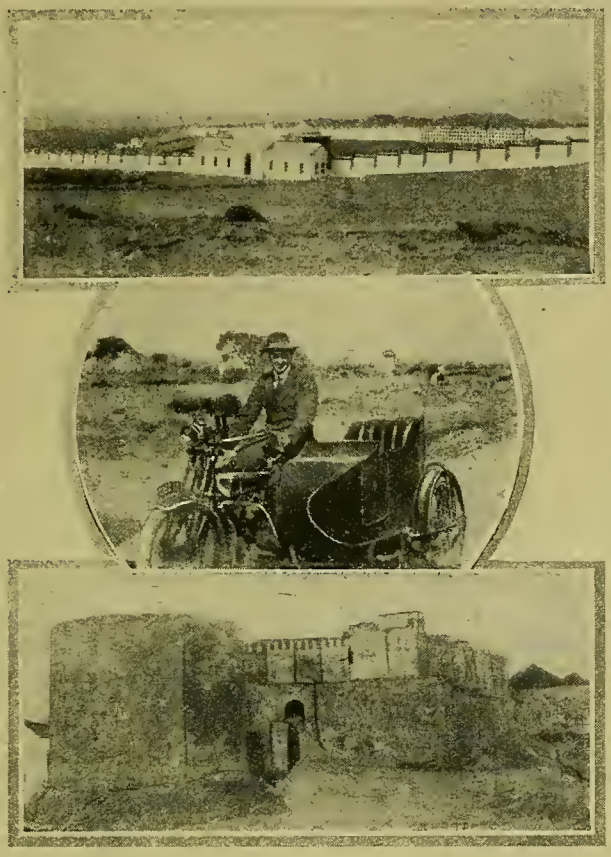
The town itself is a pretty little place. where dark fir trees show to advantage the quaint white buildings, and the mountains form an effective background.

Civility and Good Food.

The hotel is a crude place as compared with any English inn, but we were treated with great civility, and brought course after course of Spanish dishes, all well cooked and cleanly served.

After lunch we strolled round the town, and were pursued by a horde of children clamouring for "pennies"—the only English word they seem to know.

After a lounge and a smoke we returned to the outfit, and, starting up the engine at the first kick, were soon burbling up the hill out of the town on second gear. The wind that met us as we climbed the hill was terrific. This pass in the mountains is an outlet for gales blowing from the north or north-east, and has been known to blow the heavy A.J.S. outfit to a standstill—even when coasting downhill. To drive hard against such a gale is unsafe, especially downhill, as a sudden lull causes a most disconcerting acceleration which might prove disastrous on a bend.



(Top) The burying ground at Tarifa. For a yearly payment the coffin is left in one of the honeycomb partitions seen in the background, but if the payment is neglected the coffins is thrown on to a common heap.

(Centre) The A.J.S. sidecar in open country.

(Bottom) The old Moorish fortress at Tarifa, the scene of many historic and dramatic incidents in Moorish and Spanish history.

It was not long before we reached the crest of the ridge of mountains above Algeciras and were dropping down the long winding road that brings one back to something nearer sea level. Afterwards we made short work of the villainous road from Algeciras round the bay to Linea. After the atrocious surfaces of the roads that wind among the hills in a most tortuous fashion we found the fast going of the plains much to our satisfaction; and we let the engine have full throttle on the few straight stretches we encountered.

On the homeward journey, with the setting sun behind us, the hills and valleys looked their very best, and my only regret was that I had used all the films I brought with me.

Behaviour of the Natives.

Now a word about the behaviour of the people one meets on the road. It is well known that at Linea children run in front of horsemen and horsewomen galloping along the beach to polo or hunting and claim damages if knocked down, and the military are very quick to put any foreigner into prison if an accident occurs.

A Spanish A.C. road sign indicating a descent with hairpin bends.

In the country everyone gets out of the way quickly enough—whether out of politeness or fear I cannot say. Horsemen jumped the gulley at the roadside in order to give us the road in several cases, and the men in charge of the long trains of pack mules and donkeys were most anxious to get the animals on to the extreme edge of the road. As the average Spanish car is driven all out most of its time, this may have something to do with it, but the country people almost always gave us a wave of the hand and shouted "Adios" as we passed. They seemed extremely courteous — a great contrast to the townspeople.

The Iniquitous Mule.

Dogs, too, have a very bad name, but here again their bark seems worse than their bite, and though they look a very fierce tribe, they caused us no trouble beyond running alongside.

The only other animals to show signs of unfriendliness were a young bullock, which lowered its enormous horns, and a mule, which turned away with a characteristic anxiety to present its heels to anything dangerous, and threatened to put a hind leg through the sidecar wheel.

There are many old remains of historical buildings scattered about Southern Spain, most of which are associated with that turbulent period when the Moors and Spaniards were frequently in conflict. Antiquarians will find these districts prolific with objects of interest. The country is steeped in romance; but ever at its side stalks poverty, yet never that poverty that one might term wretched. The nature of the people prevents one getting that impression. Even the poorest of the poor seem to have philosophy which leads to a contentment with their lot that some people might envy, but many despise.

Altogether it was an enjoyable run, and if people choose the best roads—which they can have almost entirely to themselves—Spain is a most attractive country for a tour.

R.F.M.

THE POST-WAR MOTOR CYCLE.

A Few Notes on the Requirements of the Private Rider and on the Various Types of Engines likely to be used in the Future Motor Cycle.

By ERIC WILLIAMS, Holder of the Junior T.T.

Within a few months after winning the Junior T.T. of 1914, Eric Williams, late corporal R.E., was despatch riding in France. For many months he has been an inmate at a military hospital, where he has found time to study the weaknesses of motor cycles of the past which should be eliminated in the machine of the future. Mr. Williams refers to many interesting points anent singles, twins, and four-cylinder engines, gear boxes and spring frames, and suggests several improvements to the "flat twin" to make it the post-war ideal.

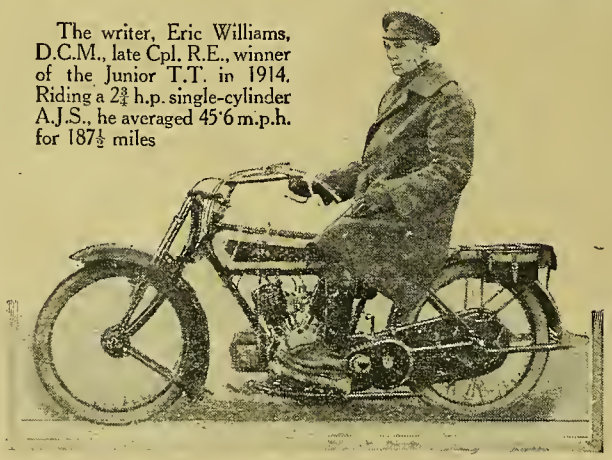
JUST now, when the reports from the various war fronts encourage one to think of an early victory, our thoughts naturally turn to the question of the post-war motor cycle. We wonder what the motor cycle manufacturers intend to offer the riding public. Have they yet made up their minds? Have they an ideal developed in the long interval since they last manufactured motor cycles? If so, will that ideal embody the ideas of the rider?

These questions probably are in the minds of most motor cyclists, whether they are in khaki or wearing a badge, and, no doubt, these riders and ex-riders of machines now two years behind their time have ideals also. Since the interests of riders and manufacturers are identical, let us consider the requirements of the average private owner, for a machine to meet these requirements must have the biggest sale in the boom which I am convinced will follow the cessation of hostilities.

We will take reliability for granted, as all first-class modern motor cycles can be called reliable. One would not ask the owner of a Rolls-Royce whether his car was reliable, neither need we consider this point in connection with any "class" motor cycle, as the trials have proved.

We require something more than reliability—something better than a machine which can be depended upon to take us to our destination, wherever that may be, and back again.

Let us take the popular 500-550 c.c. solo-sidecar machine: what are the requirements of the owner of such a machine? He wants absence of vibration, smoothness of running, accessibility (which makes for simplicity), and economy in petrol, oil, tyres, and transmission. How do existing singles of to-day compare on these points? Is such a machine our ideal? I think not. Its accessibility and simplicity are all that can be said in its favour, but on the strength of these points it will always have a fair sale with the man who has never tried anything better, the "knut" (not necessarily the speed merchant), and the amateur. The drawbacks of the single include its harshness when driving at low speeds on top gear, which does not enhance the life of belts, chains, and tyres. Makers sometimes overcome this fault by fitting a hand-operated clutch, which system unfairly uses the clutch until it will not stand up to the continual strain of slipping, and sometimes gets a permanent slip. On the point of vibration there are few singles I have ridden which do not have a "bad period" somewhere about 35 m.p.h., which fact is another point against the type when we are looking for our ideal.



The writer, Eric Williams, D.C.M., late Cpl. R.E., winner of the Junior T.T. in 1914. Riding a 2¾ h.p. single-cylinder A.J.S., he averaged 45·6 m.p.h. for 187½ miles

V Twin Advantages.

In the V twin engine we have a type possessing many advantages over the single. Its balance is not quite perfect, neither has it an even torque, so it cannot be described as the perfect power unit. I once considered the V engine perfection, and I am still in favour of it for many reasons.

The fact that it is a little out of balance and its slightly uneven torque are scarcely noticeable to the ordinary rider, and against these almost trivial disadvantages we can put down the important points that one may remove the cylinders with very little trouble. There are exceptions in the cases of some of the larger sizes, and among these the defaulters are chiefly American machines where it is often necessary to remove the complete power unit in order to get at the carbon. This operation would have to be done about every four months, more or less, if the engine were to be kept in perfect tune. This is truly a terrible state of affairs, but happily not found in the majority of the best British designs. In my opinion, there is no doubt that once a rider has experienced the delights of the twin, he will never go back to the single.

The Post-war Motor Cycle.—

But cannot we improve upon the V twin?

The flat twin is the answer. It is certainly an improvement upon both the single and the V types, because with it we obtain almost perfect balance and even torque. The life of tyres and transmission is remarkable compared with the single. Unfortunately these advantages are not unattended by disadvantages. On this latter point I have to admit I have yet to find the horizontal twin which is really accessible. With most engines of this type the complete power unit has to be removed for decarbonising, while even small adjustments are difficult.

With one engine of this type I recall being compelled to take the magneto to pieces in order to remove it for repairs.

If some engine designers will solve the accessibility problem, the flat twin will be the ideal power unit, as with the ideal engine it must be possible to slip off the cylinders, remove the carbon, grind in the valves, and reassemble in a couple of hours, in which time I have done this work on my single at the Front.

The above-mentioned disadvantages of the horizontal twin of to-day, to my mind, outweigh the advantages, and until the former are eliminated I prefer the old V twin. This represents the last word in accessibility, and is simple. With the advantages of these points in mind I can forgive its dot and carry one firing. Nevertheless it will not do for us to make shift with the "next best thing" because in the mechanically ideal type there are disadvantages which can be eliminated. The type has so many good points that the greatest efforts to overcome its few, but important, drawbacks will be more than justified. Its outside flywheel is a great point in its favour. We all know how that extra pumpful of oil when in doubt, as recommended by the makers, gums up the internal flywheels of the single and V types. This is obviated when the flywheel is outside. Then there is much in favour of the magneto position on the top of the crank case, where it is high and dry and in the very place where accessibility could best be obtained.

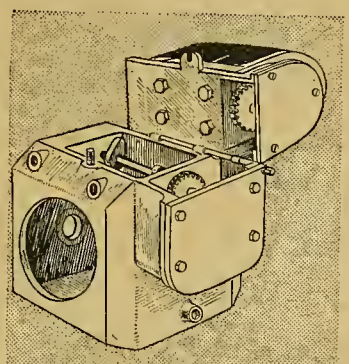
Why not have detachable heads? Copper and asbestos gaskets have supplanted the old method of boiled oil for securing a gas-tight joint. In the car world this feature is rapidly coming to the front, and there can be nothing against its adoption in the motor cycle. The head could be secured by a cross-piece, and very little clearance between the head and the frame would be necessary. Such a detachable head could be slipped off in a few minutes and cleaned out perfectly and valves ground in with the greatest ease.

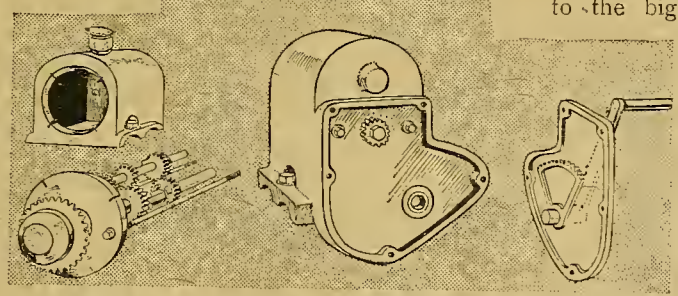
The magneto must be more accessible. At present it is hemmed in by the flywheel on one side and the timing case on the other, while over it is the cross tube of the frame. It is particularly desirable that the design should allow the removal of the contact breaker without disturbing the flywheel.

The connections between cylinders and induction pipes should be such that they may be readily attached and detached and gastight joints easily and quickly made. The induction pipes should also have a hot-air jacket with a Claudel automatic carburetter centrally fitted under the pipe and out of the way of one's legs. The machine should be tuned to give a tick over in free engine and low speeds and capable of violent acceleration.

A FEW SUGGESTIONS AND DESIGNS INTENDED TO OBVIATE THE FAULTS MENTIONED IN THIS ARTICLE.

A suggestion of our technical staff to render accessible the magneto on a flat twin. The magneto base is hinged on the cover of the crank case, and when swung over as indicated the contact breaker is clear of the flywheel.





A simple form of gear box in one piece, with cover carrying the bearings on one side. The cover has a slightly coned edge, and is drawn into position by means of two long bolts, which pass through the gear box and the blank end of the casting. By means of this design it is suggested that the whole of the gears could be drawn out of the box by removing two nuts.

The simple gear box here illustrated is fitted with kick starter To remove the gears in this case the kick starter cover would first be detached, when by taking off the starting pinion the *modus operand* would be as already described.

Forced Feed Lubrication.

The lubrication of the post-war motor cycle should be by means of a small mechanical pump, which would force oil through a drilled crankshaft to the big ends, at the same time keeping a constant level in the crank case.

The Gear Box.

We have many examples of three-speed gear boxes fitted with clutch and kick starter, but many of these are huge and cumbersome, not only on the point of appearance; also they are difficult to take down, adjust, or clean. Strong and reliable they may be, but we have progressed a little beyond this, and, in addition to efficiency, we must have neatness in design and, what is more important, accessibility. We must have some means of getting at the gears without being compelled to take the complete gear box to pieces.

Other items in the specification of the post-war ideal would include a hand-operated cork clutch with a spring easily adjustable. The transmission would be by chains throughout, and *properly enclosed in cases with inspection doors*. The brakes would be of the internal expanding type, embodied in the rear driving sprocket, and operated by hand and foot. The wheels should be detachable and interchangeable, and

The Post-war Motor Cycle.—

of a design which would permit a change over to be made in a couple of minutes, the transmission, brakes, and controls remaining undisturbed. The frame should consist only of straight tubes with a duplex tank, and the steering head should be long and substantial in construction.

The Spring Frame.

Although *The Motor Cycle* spring frame campaign went very strongly for a time, the results appear to be discouraging, but I realise that many designs may not yet be made public. Of the designs published, very few were really practicable, but, of course, many were just the ideas of readers who lacked mechanical knowledge. In my opinion what is wanted is a machine sprung at the rear by cantilever springs, and a spring front fork which will have at least five or six inches movement.

The Four-cylinder.

The four-cylinder engine is the power unit for a sidecar mount. So far the development of this type of engine has been retarded by insufficient interest on the part of both rider and maker. Probably the older engines of small size fitted with automatic inlet valves have given the type a bad name, but it is to be hoped that experiments will be undertaken after the war is over. An engine with four cylinders should not be smaller than 1,000 c.c. capacity, *i.e.*, 250 c.c. per cylinder; such an engine would be ideal for sidecar work. The cylinders of the so-called 4-5 h.p. F.N.'s which had a.i. valves were altogether too small, being less than 125 c.c. capacity. We know that a light weight engine of this size is only a toy model, but engines like the J.A.P. 2½ h.p. have demonstrated what can be done with slightly larger cylinders.

I have not used a four-cylinder machine for any length of time, but what riding I have done on this type has left the impression that it has a great future. How noticeably the motor cycle has followed the car during the past few years! I am sure we cannot go far wrong in this, and in cars the four-cylinder engine is the recognised standard power unit.

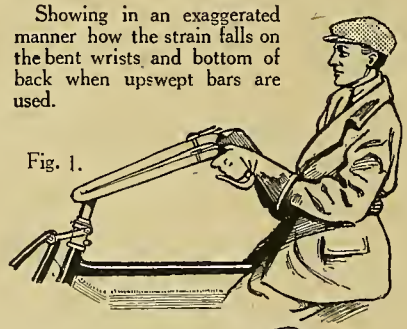
The four-cylinder engine lends itself to the car type gear box and shaft drive to the rear wheel, which should have worm drive. I will admit I have nothing very definite in my mind to account for my confidence in the four-cylinder engine as the prime mover in the future motor cycle, but it has a future as a sidecar mount, I am sure, and should not be neglected.

HANDLE-BAR DESIGN.

WHY THE SEMI-T.T. IS SUPERIOR TO THE UPTURNED BAR.

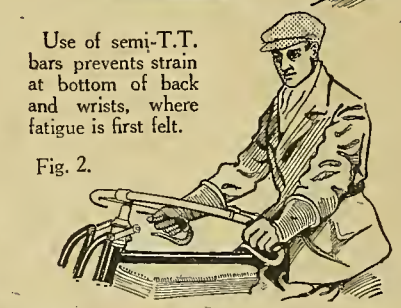
I THINK it is becoming generally realised that standard touring bars, like standard mudguards, fall short of practical requirements. Many an excellent machine, particularly among those of the heavy sidecar variety, is rendered uncomfortable and tiring to ride simply on account of its badly designed bars.

The rider of a motor cycle is subjected to a certain tiring strain which does not exist in the case of a pedal cycle, namely, that which is caused by the forward pull of the machine when accelerating and by wind resistance. The latter force is tending to push him backwards off the saddle, and the former to pull the machine from under him. Fig. 1 shows the position of the rider on a machine fitted with ordinary touring bars of the upturned variety.



Showing in an exaggerated manner how the strain falls on the bent wrists and bottom of back when upswept bars are used.

Fig. 1.



Use of semi-T.T. bars prevents strain at bottom of back and wrists, where fatigue is first felt.

Fig. 2.

It will be observed that the arms and wrists of the rider are bent, which imposes fatigue on the arm muscles. No doubt many riders are familiar with that dull aching about the wrists and elbows after a long ride, signifying that their riding position is strained and unnatural. Unless, when in an upright position, one holds tightly to the bars with arm muscles tense, the strain falls at the bottom of the back and in the joints of one's hips. Strain at these points very soon causes fatigue, and my last long trip (assuredly my last!) on a machine fitted with bars of the "high" variety left me with backache for a fortnight. The machine was a powerful twin, ridden solo, and I could have ridden my usual semi-T.T. solo mount for double the distance without experiencing similar fatigue.

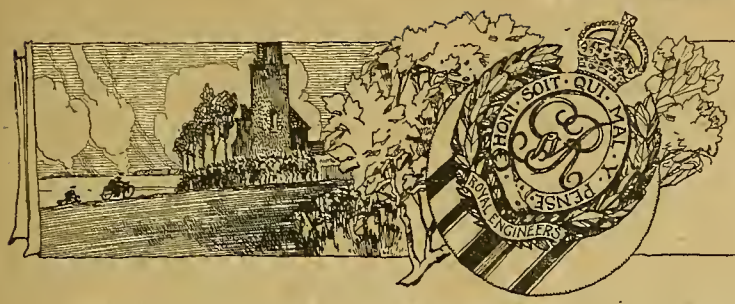
The Better Pattern.

Fig. 2 shows the type of bar which, in the writer's opinion, is by far the most comfortable and natural—quite apart from perfection of control. I do not advocate T.T. bars for the ordinary potterer, and dropped bars are out of place except on the track. The semi-T.T. bar, on the other hand, is not ugly, and is by far the best engineering compromise yet arrived at.

Referring to fig. 2, it will be observed that the arms and wrists of the rider are straight, and no strain is thrown upon the arm and wrist muscles, while the body of the rider is inclined very slightly forward, this assisting still further in easing the arms, while it removes all strain from that vulnerable point—the bottom of the back, at which fatigue begins.

Much has been learnt as regards riding position, and in all probability the war will see the last of raised handle-bars, which demand an additional fitment, viz., a back rest, when applied to a motor cycle.

H.M.B.



MILITARY NOTES.

"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS „TANKS."

ARMOURED SIDECAR OUTFITS.

AMERICAN machine gun outfits may yet be heard of in the Russian and French war zones. We are informed by the Signet Rear Car Co., of Buffalo, N.Y., that their machine gun carriage recently passed the final test by the Russian and French Commissioners, and has been approved for field use, but this does not necessarily mean that orders have been placed.

GALLANTRY WITH THE "TANKS."

THE Military Cross has been awarded to Lt. F. A. (Eric) Robinson, of Seven Kings, for great gallantry displayed whilst in command of a "Tank." After tremendous fighting his machine became "ditched," which necessitated fourteen hours' hard digging under heavy fire to release it. On another occasion his "Tank" was hit by a direct shell and damaged, but he got his men out safely and immediately went into the trenches and worked a machine gun.

Lieut. Robinson joined the Navy in November of 1914, entering the R.N.A.S., later transferring to the M.G.C., in which he obtained a commission. He is a keen motor cyclist, his mount being a Zenith.

CPL. A. J. SPROSTON'S VIEWS OF INDIA.

IN a chatty and interesting letter to Mr. Alec S. Ross, which we were courteously permitted to peruse, Cpl. A. J. Sproston, who has had experience in France, Egypt, and Mesopotamia, and is now stationed at Poona, India, speaks enthusiastically of the future possibilities of the motor cycle in India. Cpl. Sproston writes:

"The commercial possibilities of this great country are unending. With the rapid strides in education, an elaborate and efficient railway system, a network of roads in excellent condition, rivalling our own at home, it requires only a superficial survey to enable one to decide that any home manufacturer establishing his products here would be amply repaid for his enterprise. It is a sad fact," Cpl. Sproston continues, "that our cousins of the 'nasal note' have long realised that this country is excellently served by the press, almost every district having a daily journal of some sort, and in the cities and villages hoardings bearing picturesque illustrations complete an advertising campaign that is such a prominent feature of the periodicals referred to. So we find the American car predominant, though the trade here tell me that their clients would take English machines if they could get them. I was talking with a dealer the other day, who dilated on the preference of his customers (both black and white) for the English-made machine, but his tribulations on the score of delivery would have melted the heart of a Jew."

Cpl. Sproston left France in June, 1915, and in August that year went to Egypt. January, 1916, found him *en route* for Mesopotamia, where his experiences were not exactly rosy, and in July, 1916, he was invalided to India.

Lt. F. A. (Eric) Robinson, to whom the Military Cross has been awarded for great gallantry whilst in command of a "Tank." His wife is proudly wearing the coveted honour. They are both keen sidecarists, the motor cycle being on this occasion a Bradbury, though the Zenith was most frequently Lt. Robinson's mount in peace time.

T.T. RIDER IN HOSPITAL.

WE regret to hear that Capt. Noel E. Drury, Royal Dublin Fusiliers, who will be recalled as a frequent competitor in T.T. races of the past, is at present in hospital at Manchester, having been invalided home from Salonica. Fortunately, his injury is not regarded as likely to prove of permanent character, and he hopes soon to be on sick leave.

FLAT TWINS.

L.-CPL. GEORGE HOGG sends the following letter, written in the desert of Sinai. The flat twin controversy, judging from our correspondence, has created nearly as much interest Overseas as it has done at home:

"I have often intended to let you know how much I appreciate your paper out here. I did not read it before the war, but after I enlisted, nearly two years ago, I commenced to get it weekly. Since I came out here nearly six months ago, I have received it regularly, and always enjoy it. There are no motor cycles where we are, but at the bases they are plentiful. Douglases and Triumphs being in the majority. I enjoyed your article on 'flat twins' in your issue of November 9th, and, although not an expert, I think they are as near the ideal engine as one could wish. Every success!

"GEORGE HOGG (L.-Cpl.)."

Cpl. H. J. Mansfield, Heavy Section Machine Gun Corps. He is now participating in the "great adventure," and the last we heard was that he was with the "Tanks" on the Somme. He is, by the way, a recruit of *The Motor Cycle*, and an Indian enthusiast.

IN VERDUN'S "BACKGROUND."

VERDUN—what a mighty word, and how tremendously significant! The utterance of the two syllables stirs the imagination as but few words do.

ACTUAL PHOTOGRAPHS FROM THE "BACK OF THE FRONT!"

One can picture those stupendous attacks and repulses on the blood-stained slopes of Douaumont more vividly than any other phase of the conflict on the Western front or any other front, and it will be of interest to know that the photographs we reproduce were taken in the vicinity of this battlefield by a French officer who has many times contributed to *The Motor Cycle*. In his own phraseology he describes the conditions thus:

"These are photographs from Verdun's background on the occasion of another visit. I can state that the conditions of work for the despatch riders at Verdun and the neighbourhood are harder than anywhere else on the French front. They are indescribable. I can say that the chief annoyances are mud, material fallen on the ground, and drivers of horses charging one in the darkness of the night."

WELL-KNOWN MOTOR CYCLISTS HONOURED.

BOTH the well known exponents of A.J.S. machines, Cpl. Cyril Williams and Eric Williams (late Cpl.), who are, by the way, unrelated, have received honours for bravery in the field. The latter, it will be recalled, received the D.C.M. many months ago, and the latest news is that Cpl. Cyril Williams has been awarded the Military Medal. Congratulations!

New readers may be reminded that Eric was first and Cyril second in the Junior T.T. Race of 1914.

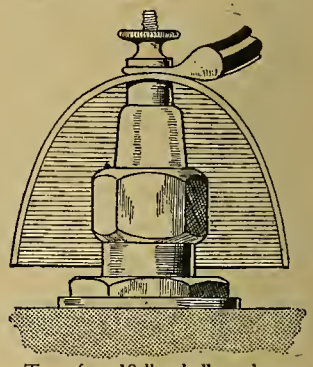
We learn also that Neville Hall, the O.K. rider who performed conspicuously in the 1914 Six Days Trial, is one of the latest recipients of the Military Medal.

PRACTICAL USE OF WAR SOUVENIRS.

A FRENCH officer attached to the British forces in the field makes use, as a plug protector, of the following original device:

His machine is a Douglas, and he has done much riding at the Front under the very worst weather conditions. He found that when he rode through a heavy fall of rain the engine stopped as often as every 300 yards or so, the plugs being coated with thick yellow mud, and thus short-circuited. Binding them with black adhesive tape cured this, but caused a tendency to overheat.

He then made use of two shell caps (eighteen-pounders, brass protectors) picked up on the battlefield. He had a hole drilled through the top, the circular



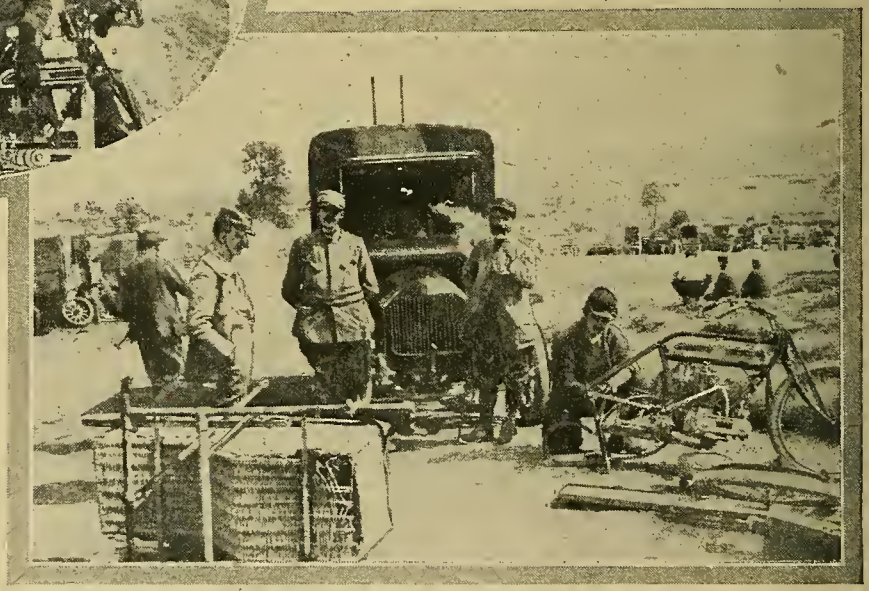
Top of an 18 lb. shell used as a plug protector

base being cut shorter so as to clear the cylinder, and simply fixed one on to each plug, the result being a very good protection against oil, water, and mud.

The two polished brass bells give a distinctive appearance to the engine, and another advantage was gained by fitting them. They constitute, by their large radiating surface, a most efficient and useful plug-cooling device—surely the most war-like and, perhaps, the simplest now in use.

THE "TANKS" IN ACTION.

SINCE motor cyclists and motorists recruited through *The Motor Cycle* play so prominent a part in the successful operation of the now famous armoured car "Tanks," there is bound to be a general flocking of our readers to the various picture theatres at which the Tank film is to be shown. The films were released for exhibition in the London district this week, and will be shown throughout the provinces.



British motor cycles are in evidence on all the Allied fronts—French, Russian, Italian, and Serbian. The pictures show a W.D. Triumph at the "back" of Verdun. The mechanic has detached the wicker sidecar (a type of double-purpose carrier in extensive use on the French front) to assist in tyre-mending operations on his machine.

A *GOOD* trade mark will suggest at a glance some attractive thought about the goods it sponsors—their uses or qualities.

¶ That is why the Stonehenge Trilithon was chosen as the trade mark of Avon Tyres—primarily because the manufacturers' ideal could be best expressed by a symbol connoting strength and endurance as the outstanding qualities of Avon Tyres. . . .

¶ Secondly, there is the important matter of origin. Stonehenge is essentially British, and "British tyres for British motorists" is no mere slogan of sentiment in these days. It voices a law of national preservation, and no true patriot will be satisfied with anything less than the genuine old English savour such as is created by the mark of the Avon Company—rubber manufacturers at Melksham in Wiltshire since 1885.

Full illustrated Catalogue free from—

Avon India Rubber Co., Ltd., 19, Newman Street, Oxford Street, London, W.

Depots—Manchester, Birmingham, Glasgow, Bristol, Newcastle, Nottingham, Aberdeen, Swansea, Paris.
1,000 Agents hold stocks. Ample supplies available.

In answering this advertisement it is desirable to mention "The Motor Cycle." B5

It's a muddy road and a bloody road,
And a road that's swept by fire,
But we've got to get through with the Orders 'bus
Or we'll raise the C.O.'s ire.

So you'll hold at the bend, I know, old girl,
You'll stick it and turn not a hair,
Just one more dash! Through one more splash!
And we're there, old girl, we're there!

The Dunlop rubber-studded non-skid motor-cycle cover.

The British Motor Industry after the War.

Important Questions affecting the Preservation of the Motor Industry.

IN discussing the subject of foreign competition, and the desirability or otherwise of a protective tariff for the British motor industry, *The Autocar* (January 6th) sets forward a number of interesting figures which clearly indicate the position of the motor car industry to-day, and cause one seriously to reflect whether some protective measures will not be necessary if it is to enjoy a reasonable degree of Overseas trade. The figures show to how great an extent American trade has increased since competition ceased, so far as England and Europe are concerned, in 1914, but, though these figures are of interest to every motorist, it does not necessarily follow that the outlook of the motor cycle industry is equally depressing.

It is roughly estimated that 60% to 70% of the motor cycles used in British Overseas possessions to-day are of British manufacture, whereas the number of British-made motor cars used in the same countries is set down as low as 15%.

The figures given in our sister journal convey a good idea as to the general position of things, and they are of particular interest to motor cyclists, because the motor cycle industry is to-day in much the same position as the motor car industry, and both will require every possible support and encouragement in order to recover from the effects of the war.

The Growth of American Trade.

Even had there been no war, American competition would have become serious, and this fact *The Autocar* illustrates by giving the figures as to importation. In 1914 American motor car imports to England exceeded those of 1913 by £598,156—truly a substantial increase—and the fact that American manufacturers will find themselves in an infinitely stronger position after the war is shown by motor car sales in America alone—the number of cars sold in the States in 1916 exceeding the number sold there in 1914 by 1,195,665. For the year ended July, 1916, the Ford output was 533,921 vehicles, or rather more than double the total number of private cars in the British Isles!

These instructive figures convey some idea as to the immensity of the American motor car industry, and that the American motor cycle industry, with its extensive home market and rapidly expanding Overseas trade, may attain similar dimensions in a comparatively short space of time is well within the range of possibility.

Our Small Home Market.

The writer further points out that this huge American industry has been built up behind a 45% tariff, but even if this tariff were abolished it would have very little effect upon the British industry, because the American industry is so thoroughly established on such a huge basis.

Another point to be considered is that the American market is at the factory door, whereas the British Empire is spread over the whole world. Therefore the American manufacturer is in a position to obtain the full benefit of a home tariff, whereas a similar tariff here would, at the best, only secure for the British manufacturer the possession of our small home market, which is certainly insufficient for the prosperity of more than a few firms.

Existing Tariff Inadequate.

The 10% preferential tariff which has hitherto existed in most of our Dominions and Commonwealths has proved insufficient to prevent the Americans, aided by their system of "quantity production," from underselling British vehicles everywhere, which is shown by the fact that out of 200,000 cars owned by the British Overseas Empire, only 30,000 were British! If British machines are really to be established in British possessions throughout the world, the preferential tariff must at least be as beneficial to British manufacturers as the home tariff, and such an arrangement would give the British manufacturer a fair chance, which is more than he has enjoyed hitherto.

Probable Changes in Production Methods.

The Autocar points out that after the war certain changes in the system of production may occur, and the tendency before the war was for each individual firm to confine itself to one or two models only, instead of making a number of different types. Then, again, it is probable that the manufacture of machines from components, built by component specialists, will become general; but before any such system bears fruit we must assure ourselves of a wider market than the British Isles present.

British methods of distribution and selling Overseas have not compared favourably with American methods, and the British industry has suffered from lack of serious attempt to provide suitable machines for Overseas conditions.

What would be the Effects of a Tariff?

Our contemporary considers that, so far as it is possible to foresee the effects of a protective tariff, everything would depend upon the amount of the duty. A small duty would be of very little service for the reasons explained, but a high duty, say from 50% to a minimum of 33⅓%, would not only help the industry to recover from the effects of the war, but would also provide some certainty of tenure for the home market. The danger of home prices becoming inflated as a result, or of new trusts or similar combinations being formed, does not appear to have become conspicuous in other countries, which have long enjoyed the shelter of a protected market.

TIMES TO LIGHT LAMPS.

GREENWICH TIME.

Jan. 18	...	...	4.52 p.m.
,, 20	...	...	4.56 ,,
,, 22	...	...	4.58 ,,
,, 24	...	...	5.2 ,,

New Road Record Claimed.

News of a new road record in America is to hand. H. Parsons, on a Harley-Davidson, claims to be the first to have covered 200 miles in 200m. on an open road. His time for ten miles was 7m. 21s. = 81½ m.p.h.

Automobile Association's Reduced Fee.

A reduction in the entrance fee for membership of the Automobile Association has been conceded. Motor cyclists may join at once on payment of 13s. 6d., covering membership up to April 30th, 1918. Light car owners may join for £1 6s. 6d., and car owners for £2 12s. 6d. The advantage of this concession will no doubt be taken by many motorists.

Dunlop Rubber Co.'s Dividend.

The directors of the Dunlop Rubber Co., Ltd., report that the nett profit for the year, including the amount brought forward from last year, is £507,967. The 6% dividend on the preference shares has already been paid, also an interim dividend on the ordinary shares at the rate of 10% per annum for the six months to February 28th, 1916, and a second interim dividend at the rate of 20% per annum for the six months to August 31st, 1916.

Motor Cyclists and Light Cars.

Many readers of this journal are prospective owners of light cars, and those who are contemplating a four-wheeler will be specially interested this week in our sister journal *The Light Car* of Wednesday, 17th inst. The issue contains articles and illustrations descriptive of economical winter cars, and demonstrates the importance of selecting a body which will be a double-purpose one, *i.e.*, suitable for winter and summer use. Such a one is the coupé. Other features are an illustrated article entitled "A Coupé in the Making," which describes a visit to a coachbuilder's, and the whole process of body building. More attractive bodies of the permanently closed type are also dealt with, and the usual features are retained.

Fellows Magneto Co.

Preferred shares to the value of over £46,000, out of the 50,000 8% shares offered, have been subscribed for and allotted by the directors.

Parts for Foreign Machines.

The prohibition of foreign machines and parts is certainly beginning to have its effect in this country. A reader has been three months waiting for a cylinder for his American made motor cycle and has not yet been successful in obtaining one. As every novice knows, imports of motor parts are prohibited.

A Good Ship Lost.

It is always sad to hear of a good ship being sent to the bottom, and it is with great regret that we learned last week that H.M.S. *Ben-my-chree*, the seaplane carrier, was sunk by gunfire in Kastelorizo Harbour, Asia Minor. Commander C. R. Samson, R.N., D.S.O., the pioneer seaplane flier of the British Navy, was in command. Before the war *Ben-my-chree* was the crack ship of the Isle of Man Steam Packet Co.'s fleet, and carried many hundreds of motor cyclists and their machines to participate in or view the Tourist Trophy races. She was a triple screw turbine ship, capable of twenty-five knots, and was the largest of the flotilla. Several other I.O.M. ships have done, and are doing, splendid work in H.M. Navy.

A "Waterbury" Motor Cycle.

Mr. J. V. Watson, a well-known Southport motor cyclist, describes a curious and amusing experience which befell a local doctor who had borrowed an Elswick sidecar outfit for the period that his Belsize car was undergoing repairs. Not being accustomed to the three-wheeled vehicle, the doctor contrived in some way to run the machine into a ditch containing about four feet of muddy water, himself falling clear into a field of potatoes. The machine stood in the ditch, immersed to the handle-bars, for fully twenty minutes, but when finally hauled ashore the kick starter was given a few digs, and, to the surprise of all, the engine began to fire! It conveyed its rider a distance of seven miles, finally stopping within a few yards of his home—a most surprising and obliging performance.

SPECIAL FEATURES:

A SIDECAR AMBULANCE (Illustrated).
THE POST-WAR MOTOR CYCLE.
IN SPAIN WITH A SIDECAR.

Fines relative to Speed.

We see that the Chief of Police in Denver, U.S.A., suggests that in order to prevent the speed limit being exceeded fines should vary accordingly, and that $5, *i.e.*, £1 per mile per hour above the limit ought to be an effective method. Although at the above rate the fines would be extremely heavy, the idea certainly sounds a fair one, and would prove much fairer than some of the unequal fines sometimes imposed in this country. Who is to estimate the speed—the constable or the rider?

The V.A.D. and Red Cross Work.

The useful work of the 5th East Lancashire V.A.D., Manchester, is being augmented by the addition of a Motor Transport Section, comprising motor cars and combinations. The duties of the motor cyclists are, on receipt of telephonic instructions from headquarters, to form bearer parties to unload trains of wounded soldiers and convey the men to the various hospitals. As Manchester is said to be the largest distributing centre for wounded soldiers in the kingdom, there is generally plenty of work to be done which is entirely voluntary. Offers of help should be made to Sec.-Lt. Woods at Newbury Hospital, or at 287, Deansgate, Manchester.

Despatch riders attached to our gallant French Ally. Desvarenne (fourth from left) is well known in France as an exponent of the Morgan runabout.

Less Petrol Probable.

The suggestion of a possible reduction in petrol allowances after April will come as a shock to motorists.

The National War Funds.

At the week-end the principal war funds stood as follow :

The Prince of Wales's Fund (distributed £3,529,719)	£6,022,829	0	0
British Red Cross Fund	5,960,897	0	0
Tobacco Fund	123,751	0	0

A Strenuous Test.

During a recent visit to the works of Messrs. A. J. Stevens and Co., Ltd., we were able to examine several engines under load test on the bench. The engines are run on full load for eighteen hours without any concentrated air draught, the fuel used being coal gas from the town main. We are told that the engines seldom overheat during this strenuous test, though coal gas gives a very much hotter explosion than petrol.

Running on Coal Gas.

The A.J.S. testers state that coal gas is not very satisfactory as a fuel. The explosion it gives is more by way of being a detonation than that of petrol, and though an engine will "rev." indefinitely on coal gas, it gives off little power. An engine which will develop about 8 b.h.p. on petrol will seldom develop more than 4 b.h.p. on coal gas.

Measuring Gradients.

Is a gradient of 1 in 1 vertical? We have heard this point disputed many times, so perhaps a brief explanation will clear the atmosphere. In railway engineering a gradient of 1 in 1 is vertical, the distance being measured in this case along the surface traversed, but in road engineering a gradient of 1 in 1 is equivalent to 45°. In road engineering the measurements are made along the two sides of the triangle which adjoin the right angle.

The Newcastle Motor Club.

The Newcastle Motor Club held its annual general meeting on the 9th inst., and, judging from the report we have received, the club still seems to be in a fairly flourishing state. Last year funds were utilised in providing comforts for wounded soldiers in local hospitals, and we are informed that practically the whole of the club has qualified for first-aid work. Following upon this, the club is associated with the V.A.T.S. (Air Raids), and the members perform duty in calling the nurses to the various stations

Warning to Petrol Users.

The daily papers on Tuesday published a statement to the effect that the Petrol Control Committee had learned that motor spirit licensed for consumption, free of duty, in commercial vehicles, is in some cases being used in private cars without the full duty being paid, and also that motor spirit is being supplied by retailers without any corresponding entry on the licence. The committee gives notice that proceedings will be taken against offenders. As a matter of fact, as *The Motor Cycle* has pointed out before, the system of petrol distribution by licence is open to all sorts of tricks (some of which we have exposed) and possible evasions.

War Loan.

The Dunlop Rubber Co., Ltd., has applied for a quarter of a million of the new loan.

Values of Second-hand Machines.

The question as to the extent to which the present inflated prices of second-hand motor cycles will be affected when peace returns is discussed in our leader this week.

From Motor Cycle to Light Car.

Many motor cyclists know Miss Nora Hough by name as a pre-war competition rider on a Douglas. In Wednesday's issue of *The Light Car* she relates her experiences with a light car coupé, under the title of "Leaves from a Lady's Log Book."

The Trade and National Service.

The position of the motor cycle trade, as outlined in our leading article of January 4th, is still being discussed anxiously by leading men in the trade. It is hoped and expected that Mr. Neville Chamberlain, the Director General of National Service, will be sympathetic to an industry which has rendered such good service in the war and brought to this country so much gold.

A Rotary-engined Motor Cycle.

When *The City of Birmingham* went down some few weeks ago there was on board a most interesting new design of motor bicycle possessing a rotary engine. The machine is the invention of a native of India, and he was taking this forerunner of a model, which is intended to startle the earth, back to India with him. The inventor is very optimistic as to the success of his design, and is confident that it will not be long before public curiosity in the successful application of the rotary engine to a motor cycle is satisfied. Though the man responsible for the machine obtained particulars of insurance facilities, at the last moment he decided not to avail himself of them. Bad luck indeed! We learn that other specimens are well on the way.

A Motor Cycle Thief.

In our issue of December 14th we mentioned a case where a man in uniform wearing shoulder letters of the 7th Lancers (which regiment does not exist) had succeeded in stealing a motor cycle. Evidently the same person is at work again, for the Metropolitan Police are on the look out for a man about twenty-four years of age, wearing khaki, with two wound stripes on the left arm, who states that he is in the Lancers, and attempts to victimise persons with motor cycles for sale. Just lately, it is alleged, the man has succeeded in getting away with machines from Shepperton, Battersea, and Wandsworth. He always tells the same tale, that his commanding officer has seen the machine advertised in the papers and had sent him to try it with a view to purchase. To one of his victims, an Army officer, he produced a forged letter from a colonel in the Lancers, authorising him to try the cycle. The wanted man is about 5ft. 8in. in height, and has a very sallow complexion. He has two gold teeth in his upper jaw. He invariably replies to advertisements which have appeared in *The Motor Cycle*.

A Machine Gun Demonstration.

On Friday, the 12th inst., the Blackpool Motor Volunteers were given a demonstration of the latest Lewis machine gun, a sample of which was secured for the purpose by Cpl. T. Sharples. It was shown how deadly a weapon this gun may be in the hands of an experienced marksman, and it is hoped that the Corps will soon secure one of their own. These guns have a range of over 2,000 yards.

The Best Use of Men "Called Up."

In assuring the Government of its desire to assist the Director of National Service in any way possible, the Executive Council of the Association of Chambers of Commerce of the United Kingdom points ont that "from its own experience as representing many of the principal cities and towns in the United Kingdom the best use is not being made of the men now called up, in that more men than are necessary are being employed upon work; that men having definite duties have not enough work to fill up their time; and that men are often not placed in positions for which their previous experience qualifies them."

Another "Just So" Story.

A correspondent to the *Hull Daily Mail* gives a very entertaining account of a despatch rider's adventure in East Africa. He says :

"One of the squadron motor cyclists dashing along the road with a despatch became suddenly aware of a rhinoceros which bore down npon him, passing close behind him. An exciting chase ensued, which resulted in the cyclist abandoning the bicycle to its fate, and hiding himself in the long grass. In all probability the fumes from the petrol prevented the rhinoceros scenting the cyclist, for he spent some time in cautious examination of this new inhabitant of the jungle. Then he trotted off, and the motor cyclist attempted to regain possession of his machine.

"To his horror, however, he perceived the rhinoceros returning, and again fled to cover. However, the great beast, which showed signs of having been wounded, disappeared."

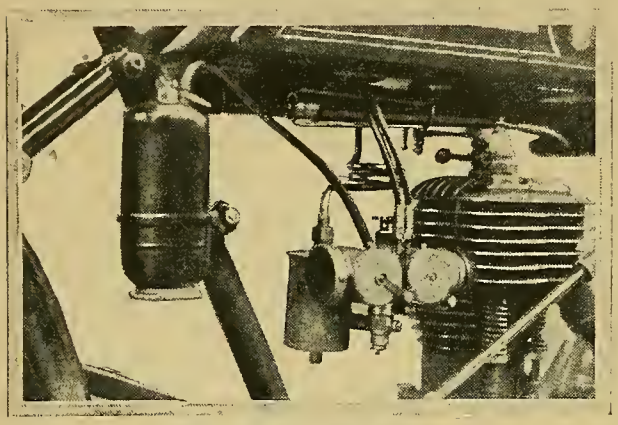
1917 American Models in England.

We have received a letter from the Wulfruna Engineering Co., Ltd., which asks pertinently how 1917 model Harley-Davidson motor cycles can be offered in face of the embargo on foreign imports of motor vehicles, and suggesting that the Motor Cycle Manufacturers' Union should take the matter up. The Wulfruna Co.'s representative is moved to complain by reason of the fact that the British Government is stopping the production of motor cycles in this country from the 15th proximo, as mentioned in our last issue. We are able to throw some light on this case. The facts, as we understand them, are that a few weeks ago, at short notice, the Harley-Davidson Co. agreed to release the whole of its stock of H.D. machines to the Russian Government for Army purposes on the condition that they were granted a permit by the Board of Trade to import new machines from America to replace the stock. This course, in the exceptional conditions, was allowed.

STARTING ON ACETYLENE.

A Convenient Method of Starting an Engine run on Heavy Fuel.

IT has been known for a long time that an engine can be run on acetylene gas. Acetylene gas, however, is somewhat uncertain in its action, and therefore it is not advisable to run an engine continuously on it. This gas has been employed successfully by Mr. H. G. Passey, model railway engineer, 74, Bertram Road, Hendon, London, N.W., for the purpose of starting his $4\frac{1}{4}$ h.p. B.S.A. motor bicycle when using pure paraffin. The jet consists of a $\frac{1}{8}$in. brass tube fixed into the vaporising chamber of the B.S.A. carburetter, having a $\frac{1}{16}$in. hole. To start the machine the paraffin is turned on, the carburetter flooded, and the water turned on in the small generator, which is connected to the auxiliary jet by means of a rubber tube. After injecting paraffin into the cylinder for the purpose of freeing the rings the engine may be started. The machine in question is a 1917 model $4\frac{1}{4}$ h.p. B.S.A., which is quite new and has only run a few miles.



A rubber tube conveys the acetylene gas to an auxiliary jet inserted in the top of the carburetter.

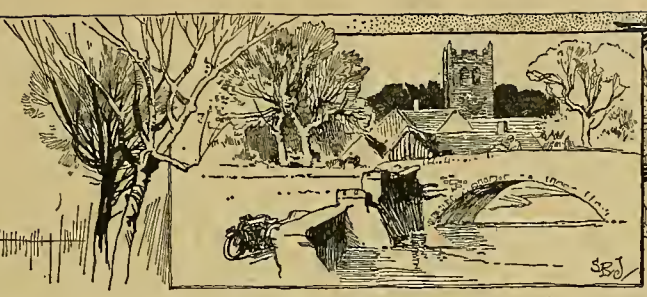
No Need for Petrol.

As the day when we inspected the device was cold, the engine was very stiff and starting was not particularly easy. The machine had to be pushed to start, which it succeeded in doing after the third attempt. Immediately the gas had started to generate, the water was turned off and the engine at once fired, the paraffin smoking a little as it did so, but probably when warmed up there would be no smoke at all. Mr. Passey is so pleased with the success of his device that he has decided to fit it to standard makes of carburetters. He will fit a standard carburetter with a jet for 12s., and supply a complete outfit with generator for 22s. 6d. With this device there is no need for petrol at all, as the machine will start on the acetylene and fire the paraffin immediately afterwards. Mr. Passey also claims to run about 50% more mileage to the gallon with paraffin than with petrol.

MEETING OF THE 17th W.D. VOLUNTEERS.

A meeting of the motor cycle section of the 17th W.D. Volunteers at Owler Bar, near Sheffield. It was the final run for three of the members, who are about to leave for active military duties, and after operations the members unanimously decided to make them a presentation in the form of a roll containing articles useful on active service. (Inset) Commander Riley on a Clyno outfit leaving the meeting.

Lightweight Transmission.



A COMPARISON OF THE VARIOUS METHODS IN USE.

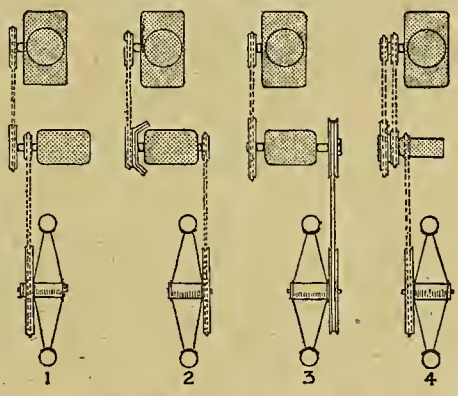
I HAVE recently been sampling transmission systems on various lightweight machines, and have come to the decision that a combination which does not appear to exist would be about ideal—namely, chain-cum-belt drive with a friction gear on the lines of the Enfield. The existing two-speed systems may be set down as follow:

1. All chain, with gear box only.
2. All chain, with gear box and clutch.
3. Chain-cum-belt with gear box only.
4. All chain, with friction gear.

Simplicity, Foolproofness, and Cheapness Essential.

My present lightweight is all chain with gear box only, and so far as my own use is concerned this little machine leaves nothing to be desired. But a lightweight should be essentially a machine which any juggins can ride, and therefore the gears should be foolproof. It is really astonishing what gears will stand, but it makes one shudder to see the uninitiated idiot, after missing his gear, allow the machine to come almost to a standstill, then slam in the low gear with the engine racing. Therefore the system, excellent though it is in the hands of a rider who knows how to "wait for his engine," falls short of permanency in that it can be atrociously bungled by the novice.

SIMPLE SKETCHES OF PRESENT TRANSMISSION SYSTEMS.



No. 1 shows gear box only; No. 2, gear box and clutch; No. 3, chain-cum-belt; No. 4, tri-chain gear.

Next on the list is the all chain drive with gear box and clutch. This is all right so far as it goes, but there are so many conflicting opinions as to whether or not a clutch is necessary on a lightweight machine that the system is hardly likely to hold its own against the combined gears and clutch (friction gear). It seems to me that the only important point in favour of the separate clutch is that it can be controlled from the handle-bars, and a properly tuned lightweight will run so slowly that this is superfluous.

Then again, we are adding complications, weight and cost. A clutch, to be of any real use, must be of certain dimensions which do not fit in with the compact and diminutive measurements of the permanent lightweight, and an inefficient clutch is a thousand times worse than none at all. There are, unquestionably, one or two lightweights with this form of transmission which leave little to be desired, but judging the system from an entirely unbiased standpoint it would seem to me that it falls short of permanency. Simplicity, cheapness, and absolute foolproofness are the necessary constituents of the permanent lightweight, and it would appear that this system is ruled out on all three.

Smoothness and Controllability.

We come now to the chain-cum-belt with gear box only, *i.e.*, no clutch. In this case the belt performs a valuable function in that it absorbs the nerve-racking shocks which occur when the rider, in changing gear, does not wait for his engine. But that the shocks *do* occur, and that shocks cost money whether or not they are partially absorbed, is obvious. The lightweight rider will always include the learner and the unteachable, and in the majority he will not possess that fine judgment necessary for changing gear on a solid drive.

All chain with friction gear—Enfield system. This is the best I have come across, on account of the foolproofness and smooth engagement of the gear, but I prefer the final belt drive in the case of lightweight machines, because it is absurdly cheap to run. The arguments against the chain-cum-belt system when applied to a heavyweight lose their force when the system is applied to a lightweight. Therefore I think that the friction gear in combination with the belt drive would be very near the ideal, and it would mean that the strain on belts and tyres would be so greatly reduced that their wear would be almost indefinite.

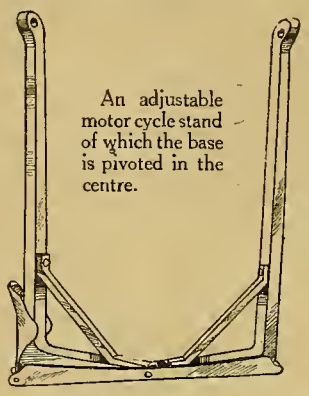
Then, of course, there is the huge advantage of having a free engine position from which one can make a standing start if through bad surfaces or an up gradient such a proceeding is necessary.

Summing up, then, I have criticised no particular system, but all of them, and have recommended one which does not appear to exist. The friction gear is, in my opinion, undoubtedly the best for lightweights, not only on account of its absolute foolproofness, but on account of its convenience and simplicity. Its use does not require that fine judgment which only experience can give to the rider—experience which a large number of lightweight riders will always be without. Whether or not it be combined with a chain-cum-belt or an all-chain drive is, perhaps, a matter of personal tastes.

H.M.B.

AN ADJUSTABLE MOTOR CYCLE STAND.

TO stop and stand a motor cycle on a slanting pavement or side hill is impossible at times with the ordinary stand, as its base will take the position of the sloping surface. The



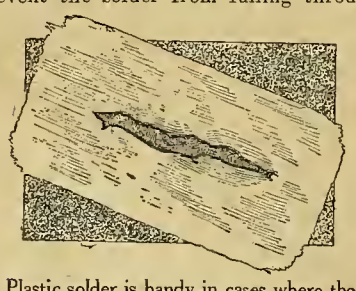
An adjustable motor cycle stand of which the base is pivoted in the centre.

stand illustrated has been designed to overcome this difficulty, and, since practically all England is engaged upon war work, it is almost unnecessary to state that the device emanates from America.

The base of the stand is pivoted in the centre, and a short vertical lever is made to slide on one of the side members. When a machine is pulled up on to this stand, foot pressure on the end of the lever enables the base to accommodate itself to any angle of the road, and compensates for any grade, thus keeping the machine upright. A stand of this character is really wanted on sidecar machines, which when on the stand usually are resting on one leg only.

PLASTIC SOLDER.

WE have lately been putting to a test some plastic solder sent to us by Mr. A. P. Bevan, of Willestrew House, Tavistock, Devon. With this solder it is possible to mend quite large holes, and we show herewith a sketch of an actual repair. The gash measures 32×4 mm., and has rough edges, but the solder has effected a sound repair. It was applied without any support to prevent the solder from falling through.



Plastic solder is handy in cases where the ordinary metal could not be used.

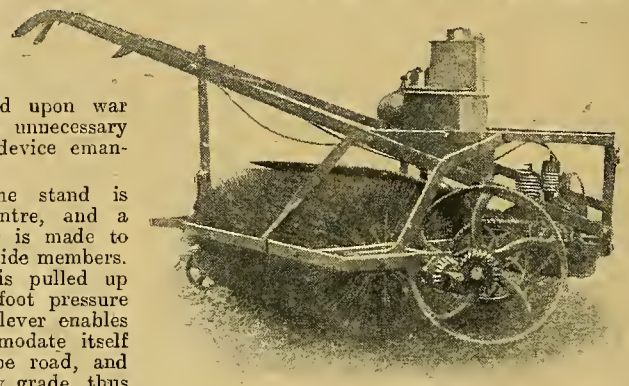
If the soldering iron be not too hot, the solder takes the consistency of putty, and is very easily applied. It should prove most useful for such a job as mending a motor cycle tank.

Mr. Bevan, who is on military service, is anxious to get the manufacture of this solder taken up on a large scale.

AUTO TREBLE-PURPOSE ROAD SWEEPER.

THE principal object in utilising a small-powered petrol engine in conjunction with a road sweeper was to enable one man to carry out the operations of sweeping, tarring, and gritting without additional help. As will be seen from the photograph accompanying, the rear of the chassis carries the rotary sweeping brush, and is cut away from the centre to one side. The grit, tar, and petrol tanks are carried on a bracket above the machine.

The engine is mounted on a platform to the fore, and its power conveyed by means of countershafts to the road wheels and various moving parts. Small-sized



An Auto-wheel power unit is used to propel this treble purpose machine, which is capable of sweeping, tarring, and gritting roads, with only one man in charge. It is a sign of the times to observe the adaptation of a petrol engine to a road sweeper.

road sweepers are guided by an operator walking behind; on larger sizes he is mounted on the machine. The makers, the Road and Street Appliance Co., Greenock, inform us that it has proved entirely satisfactory, even with a small-powered air-cooled engine, though on the larger machines the intention is to fit water-cooled engines.

MAGNETO ANGLE.

ANENT a question published in *The Motor Cycle* recently, a correspondent has sent us sketches showing how he altered a magneto designed for a 50° twin to fire accurately an engine with its cylinders set at 48°. The firing intervals on a 50° twin are 410° and 310°, but as a magneto runs at half engine speed the angles between A and B will be 205° and 155°. The latter angle must be increased to 156° to render the magneto suitable to a 48° twin, and this can be attained by grinding approximately one-third of a millimetre off the cam either at A or B, the points where

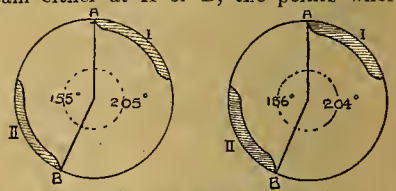
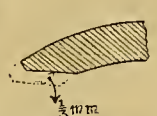


Diagram showing angles between firing points on the contact breaker.

the rocker arm makes contact with the cams. This, of course, must be done very carefully.



The dotted lines show the portion of cam ground away.

AVERAGE PRICES.

WE give below the average prices of second-hand models offered for sale in *The Motor Cycle*. Where it is possible to obtain a sufficient number of each model the average for the past week is quoted, otherwise the last average is given, if within four weeks. Difficulty in obtaining a sufficient number of one particular model often arises, owing to the fact that many advertisers omit some of the most essential details.

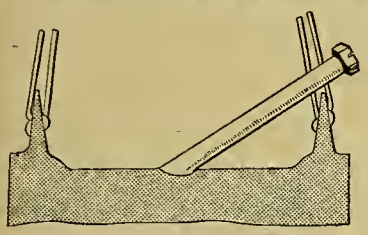
Make.	Year.	H.P.	Average for last week.	Latest weekly average obtainable.
A.J.S.	1916	6 3-sp. sidecar	—	£95
„	1915	2¾ 3-speed	—	£40
„	1916	2¾ 3-speed	£52	—
„	1912	6 sidecar	—	£40
Allon	1916	2-stroke, 2-speed	£38	—
Ariel	1916	5 3-sp. sidecar	—	£80
Bat	1912	6 3-speed	—	£32
„	1913	8 2-speed	—	£39
B.S.A.	1916	4½ 3-speed	£55	—
„	1916	4½ 3-sp. sidecar	£64	—
„	1915	4½ 3-sp. sidecar	£60	—
Calthorpe	1916	2¾ 2-speed	£25	—
Clyno	1913	6 3-sp. sidecar	£40	—
„	1912	6 2-sp. sidecar	—	£36
Connaught	1914	2-sp. 2-stroke	—	£23
Douglas	1916	2¾ W.D.	—	£50
„	1915	2¾ 3-speed	£48	—
„	1915	2¾ 2-speed	£42	—
„	1914	2¾ 2-speed	£38	—
„	1916	4 3-sp. sidecar	—	£70
„	1913	2¾ 2-speed	£29	—
Enfield	1916	6 2-sp. sidecar	£79	—
„	1916	3 2-speed	£47	—
„	1915	3 2-speed	£38	—
„	1915	6 2-sp. sidecar	—	£76
„	1914	6 2-sp. sidecar	—	£58
Excelsior	1916	7 3-sp. sidecar	—	£70
H.-Davidson	1916	7 3-sp. sidecar	£86	—
„	1915	7 3-sp. sidecar	£66	—
Henderson	1915	4-cyl. sidecar	—	£67
Humber	1914	3½ 3-speed	—	£35
Indian	1916	Powerplus sidecar	£83	—
„	1915	7 3-sp. sidecar	£60	—
„	1916	5 3-speed	£55	—
„	1915	5 3-sp. sidecar	—	£58
„	1915	7 clutch	—	£40
James	1915	4½ 3-sp. sidecar	£68	—
Levis	1915	2¾ 2-stroke	£20	—
Matchless	1915	8 3-sp. sidecar	—	£65
New Hudson	1916	2-stroke	£34	—
„	1915	2-stroke	£21	—
New Imperial	1916	2½ J.A.P.	£32	—
Norton	1916	3½ 3-speed	—	£48
P. & M.	1914	3½ 2-sp. sidecar	—	£55
Premier	1914	3½ sidecar	£45	—
Radco	1915	2-stroke	—	£18
Rover	1916	3½ T.T.	—	£56
„	1915	3½ 3-speed	£46	—
Rudge	1913	3½ Multi	£30	—
„	1915	3½ Multi sidecar	—	£45
„	1915	5-6 Multi	—	£60
Scott	1916	3¾ 2-sp. sidecar	—	£58
„	1915	3¾ 2-speed	—	£46
Sunbeam	1916	8 sidecar	—	£100
„	1914	6 sidecar	£80	—
„	1916	3½ 3-speed	£75	—
Triumph	1915	4 sidecar	—	£60
„	1914	4 sidecar	£45	—
„	1913	3½ sidecar	£37	—
Williamson	1914	8 sidecar	£68	—
Zenith	1916	8 sidecar	—	£80
„	1914	8 sidecar	£45	—
„	1915	6 Gradua	£48	—

THE LATEST 8 h.p. SUNBEAM

Improvements and Refinements in the Sunbeam Military Machine.

RECENTLY we paid a visit to the works of Messrs. John Marston, Ltd., for the purpose of seeing a large consignment of sidecar stretcher carriers just completed for the British and French Red Cross Societies. The stretchers are fitted to 8 h.p. Sunbeam machines, the sidecar chassis being similar in construction to the ordinary touring model, except, of course, as regards springing.

Our illustrations convey a fair idea of the outfits, which, it will be recalled from an account in our Christmas Number, are performing excellent work in connection with the British Ambulance Unit working in conjunction with the French Army in the Vosges. The stretchers can be removed from the chassis or remounted in a few seconds, the attachment being



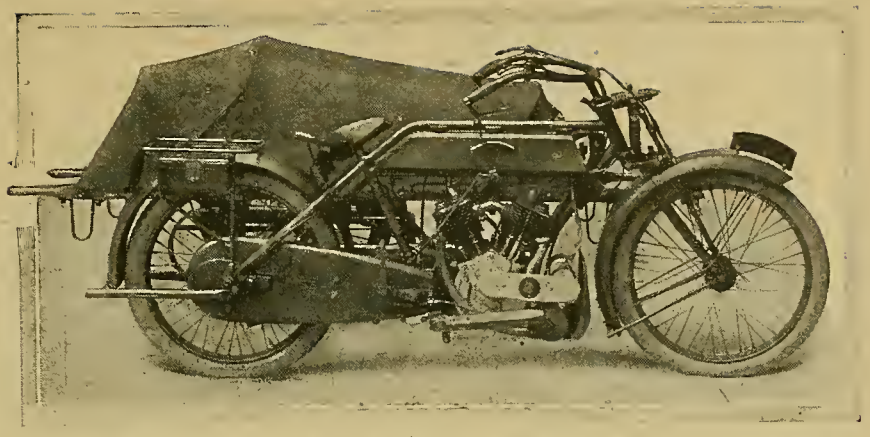
A tube is extended through the wheel spokes, so that oil can be conveniently forced into the hubs by an oil gun.

by means of a very simple locking device, brought in and out of action by the movement of four small levers placed at the points of support.

All the machines supplied for the British Red Cross Society are fitted with Parsons non-skid chains on the rear wheels.

Increased Ground Clearance.

A very large number of Sunbeam machines are still being supplied to the various Governments, and at present the works are concentrating on an order from the Russian Government for forty-five machines per week. All these are the famous 8 h.p. model, half the order being for sidecar ammunition boxes and the other half for ordinary sidecar outfits.



The latest 8 h.p. Sunbeam has 28in. × 3in. tyres, increased ground clearance, wider mudguards of dome shape, and many detail improvements.

The military model 8 h.p. J.A.P. engine Sunbeam differs from the touring model, with which our readers are familiar, in several important points of design. In the first place, a minimum ground clearance of 6in. is provided, this being obtained by slightly raising the frame, so that the top bar takes a rather deeper fall to the saddle, and also by fitting 28in. wheels and 3in. tyres. The fitting of these large wheels is, we consider, an excellent point, and particularly desirable in the case of a military sidecar machine.

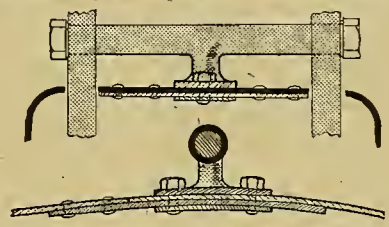
Detachable Wheel and Clutch Improvements.

All the wheels are, of course, detachable and interchangeable, and the original design has been simplified and refined. By simply loosening off one nut the wheel spindles can be drawn out, this allowing the wheel to fall without further trouble.

The plate clutch contains double the original number of plates, the gripping surfaces being phosphor bronze to steel. The plates are now drilled instead of being provided with oil grooves, as in the original model—a much better arrangement, since the oil grooves were apt to accumulate dirt and became filled up, so that the clutch required occasional dismantling and cleaning. Besides requiring less attention, this clutch is even more perfect in operation than its predecessor, being remarkably sweet in engagement, and when properly home the drive is almost positive.

Lubrication.

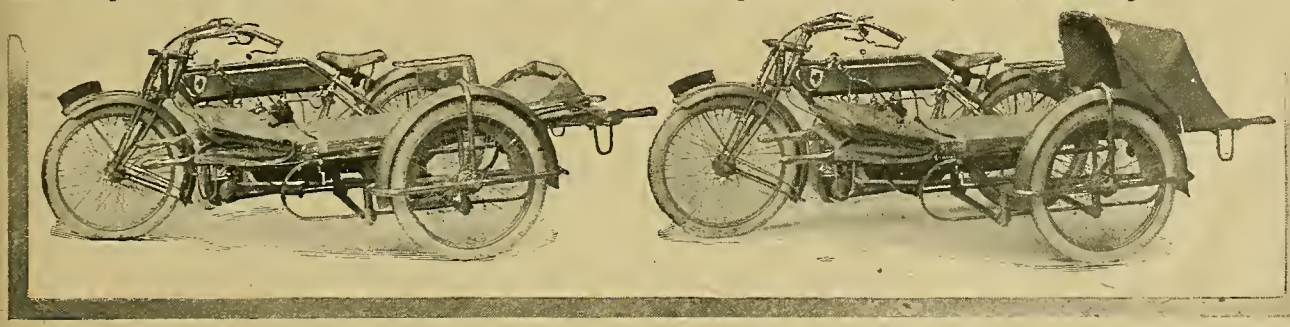
Rotherham grease cups are used for all minor bearings in place of oil cups, and a highly practical arrangement for lubricating the wheel hubs has been adopted. As shown in our illustration, a tube projects from the centre of the wheel hub, the end of this tube, which protrudes just through the spokes, being



Section of front wheel mudguard. The manner in which the two sections of the guard are attached and suspended from the forks.

sealed by a hexagon-headed screw, which is provided also with a slot so that it can be removed either with a small spanner or screwdriver. Every machine is equipped with an oil gun, so that stiff oil can be forced into the bearing *via* the tube. This convenient and thoroughly practical method of lubricating does away with the awkward and unclean business of inducing inadequate quantities of oil to enter by the usual small orifice.

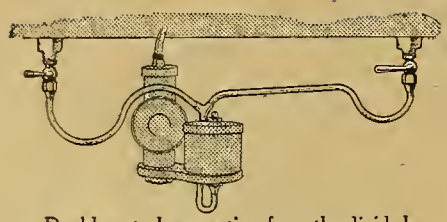
Another point of design, which can hardly be regarded as one of insignificance, is the new design of front wheel



A specimen of the present type of 8 h.p Sunbeam stretcher carrier as supplied to the British Red Cross Society and to la Croix Rouge Francaise.

The Latest 8 h.p. Sunbeam.—

mudguard. The guard is about 8in. in width, enclosing the fork stays and the brake, and giving very ample clearance for the tyre. This guard is almost flat, but the edges are domed over to prevent mud escaping from its interior, and, since it encloses the forks, it must, of course, be in two sections. The attachment, however, is strongly made, the guard being suspended from the frame at this point by a substantial lug which forms part of one of the fork struts. It is inconceivable that such a guard could become clogged, even under the most trying conditions.



Double petrol connection from the divided tank to the carburetter.

The tanks of both models are now partitioned laterally, each partition having a capacity of 1¼ gallons on the 8 h.p. and 1 gallon on the 3½ h.p. models. Separate leads are taken to the carburetter—a very convenient arrangement for those using heavy fuels.

The Sunbeam people are certainly putting their military experience to good practical use, the outcome of which will undoubtedly be the production of a machine meeting the demands of every practical rider, whether at home or abroad. Though the whole of the factory is employed on war work of one kind or another, there is every sign that steady development and perfection of detail are going on, so that we can cheerfully anticipate a post-war model *par excellence*.

A Dutch Endurance Test of 558 Miles.

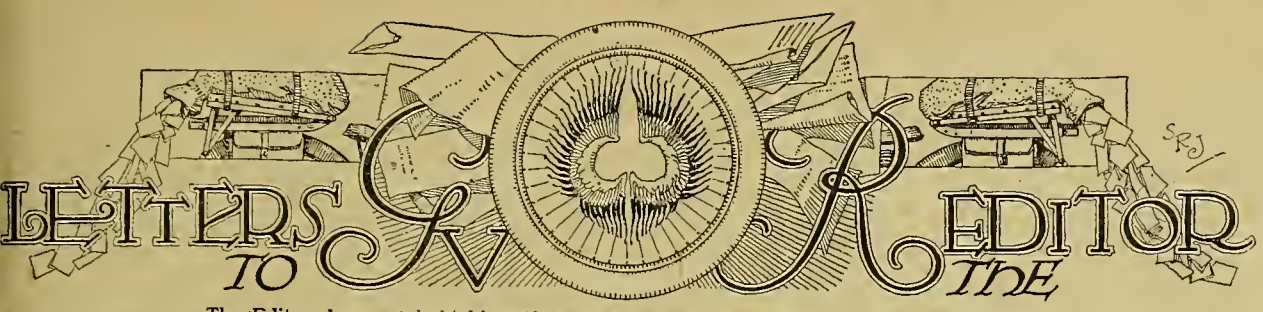
(Top) The American Excelsior military team at Amersfoort.

(Right) Martin C. van de Wal (7 h.p. Excelsior, on the left), winner of the special prize for completing the distance without rest.

(Left) Lt. Bolton (2¾ h.p. Douglas), who finished successfully. This British mount was easily the lightest of the eleven surviving machines.

IN all kinds of unpleasant weather and road conditions several winter motor cycle reliability trials have been held in Holland. The last was of a particularly strenuous nature, consisting of a continuous test of thirty-six hours, in which regular running to a schedule was the chief condition. A circular course was plotted out of approximately ninety-three miles, which had to be covered six times, giving a total distance of 558 miles. Among the twenty-one starters three rode British-made machines, viz., Sun, Rover, and Douglas, the latter, ridden by Lt. Bolton, completing the course successfully, and showing the ability of a 2¾ h.p. machine to follow 7 h.p. mounts in all weathers.

Among the competitors were two military teams, one riding Harley-Davidsons and the other American Excelsiors. Rain and snow were encountered during the run, and many experienced nasty falls owing to the unspeakable road conditions. Only half the competitors successfully completed the course. A special prize offered to riders making the best performance and taking the whole course without rest drew two competitors, the winner being Martin C. van de Wal.



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

ARMY MOTOR CYCLES FROM THE FRONT.

Sir,—After the war, what will become of the hundreds of motor cycles now in use at the Front? It is hardly probable that the Government will retain all of them, even if sound in wind and limb.

There will, without a doubt, be a mass of motor cycling enthusiasts after the war who will search your columns for their particular fancy. I can see a great danger looming ahead with regard to the second-hand mount; for example, the 1915 model which has been carefully stored during the war and the 1915 model from the Front. What a difference there must be between the two mounts, yet they will probably appear identical in the advertising columns, and how is the prospective buyer to distinguish between them?

If all, or part, of the machines from the Front are bought by dealers, who, after a slight overhaul, glut the second-hand market, the private man will suffer. The great danger to the buyer lies in the hidden defects in the machines which have been ridden at the Front, which, although not apparent when bought, would show themselves after two or three months' usage, and, consequently, the reputation of the makers will be at stake through no fault of their own. The buyer's safety will also be at a discount if he gets hold of a machine which has been ridden at the Front and patched up for sale. If the different firms who have supplied the Government with motor cycles will repurchase them the solution is easy; if not, I can see chaos and disaster in the second-hand market.

ALFRED CLARK.

THE CASE FOR THE LONG STROKE.

Sir,—I have not followed all the previous discussion which has appeared in your valuable paper on long *versus* short stroke engines, but have just read with great interest my friend Mr. Norton's excellent article, "The Case for the Long Stroke." He certainly makes out such a good case for his splendid long stroke motor that many people after reading his article may jump to the conclusion that all engines with a stroke equal to, or approximately equal to, the cylinder bore were designed by men who did not know their business. Nothing could be more erroneous. Mr. Norton makes the somewhat dogmatic assertion that it is never necessary to run the long stroke engine at so high a speed as the short stroke to develop equal power. This has not, to my knowledge, ever been conclusively proved. The fact that no motor bicycle with a short stroke engine of equal capacity has hitherto equalled the wonderful performances of the Norton on Brooklands track does not absolutely prove this assertion.

After having been mixed up with the design, construction, and testing of successful engines of all types during the last fifteen years or so, I firmly believe that it would be possible to build a square engine (bore equal to stroke) with overhead valves to equal and probably surpass the Norton records.

In comparing long with short or medium stroke engines of equal cylinder capacity, Mr. Norton somewhat grudgingly admits that the latter have certain advantages not possessed by the former, viz., the short or medium stroke engine is lighter per unit of power, and that at high rates of revolution its bearing pressures are less. Therefore, I may be mistaken, but I venture to assume that if Mr. Norton were called upon to design a high-powered aero engine which has to fulfil the following three conditions: (1) Maximum compactness of power unit; (2) *minimum* weight per horse-power, which, in itself, necessitates power being developed at a high r.p.m. with a high volumetric efficiency; (3) highest possible degree of reliability—we should then see the *medium* stroke Norton competing with some of the best aero motors in the world which have a bore and stroke ratio of approximately 4¾in. to 5in.

J. T. CLARKE.

SINGLE V. TWIN-CYLINDER ENGINES.

Sir,—It is quite apparent, without any careful study, that your correspondent, Mr. Addenbrooke, has not had a sufficient experience with the flat twin to realise all its good qualities, when we read his ideas of the engine fixing not being secure enough to avoid pulling over towards the driving side.

We beg to point out to him the method with the most popular 2¾ h.p. model now in the market, and also the "slide rest" type of engine fixing applied on the 4 h.p. of the same make; this absolutely *does* prevent any possibility of his mythical trouble.

Having had a fairly varied experience with the points he mentions we can emphatically say that if the engine is fixed in the frame vertically in the first place when the machine is assembled, it will be found that after all the gruelling it can be put to (and it gets it here, Wiltshire) it has not shifted at all.

May we also ask, if Mr. Addenbrooke judges a motor cycle from his own ability to drill holes in the radiator fins of his cylinders, whether he has been in the habit of so doing, and for what reason? He will find, if he looks round, that all the cylinder fins of better class machines made of cast iron are, by a special process in the casting, left hard, or brittle, as he calls it, partly perhaps owing to a special mixing of the metal, and the fact of its being cast by people who *do* know just what this important part of a motor cycle should be.

We must, whilst fully realising the sterling qualities of the A.J.S. machine, differ from him in his claims of it having the most silent timing gear on the road, and ask him to have another look round, see, ride, and generally study the principles of design of other machines, and then perhaps he will realise that the Americans are not far off being there every time; also the M.A.G., etc., which, although we do not agree with all Mr. de Lissa's ideas, is undoubtedly a very fine example of engineering in this respect. The 4 h.p. Douglas also cannot be called a serious offender in the matter of timing gear, being quite as quiet as the one Mr. Addenbrooke mentions, yet not "the most silent on the road."

The usual disclaimer in cartloads.

WILLIAM MULLIS.
ARTHUR COPE.
S. A. MARKS.

"The Motor Cycle Shop," A.S.C., M.T.

Sir,—I do not quite see the logic of "R.E.C.'s" statement that the fact that there are more parts does not help to make a breakdown! What are the chief causes of trouble on the road?

(1.) Plug trouble. It is obvious at once that the more plugs are used the more chance of sooting up, or oiling up, etc. Twin cylinders, twice the chance; four cylinders, four times the chance; and so on.

(2.) Broken piston rings. Every cylinder added to the engine must mean an extra chance of this occurring.

(3.) Seizing up of the piston, or broken piston, broken connecting rod, or trouble with the small end bearings—it is again obvious that the same argument applies.

It is common to hear the single spoken of as a "jerky" engine; but if one considers that at an average speed of 2,000 r.p.m. there are no fewer than sixteen power strokes a second, it will be seen that the four-stroke single compares favourably with an ordinary steam engine of the same power, as evenness of torque, of course, depends solely on power strokes per unit of time, and even an "eight stroke" single (if there were such a thing) would give a torque even enough for all practical purposes if it could be run economically at double the revolutions per minute as a four-stroke single.

The old bugbear of extra wear on tyres and transmission with a single compared with a multi-cylinder was exposed long ago. I get over 2,500 miles from my back covers before they require retreading, and I do not think that can be bettered by any twin. Nearly all my work is with heavy loads in the sidecar.

The only case I have had in five years of chain breakage was on a two-stroke twin. Of course, if riders will overgear a single and let the revolutions down so as to cause tugging, they must expect trouble with wear. Also, it is common to see some riders attempt to crawl round a sharp corner at little over walking pace on top gear to save the trouble of changing down (not much trouble with a Sturmey-Archer countershaft gear!). This, of course, is rough on the engine and tyres; but, if driven with a little intelligence, always "keeping the revolutions up" whatever the gradient, there will be no undue wear.

MICHELMORE HITCHCOCK.

Sir,—Though following with great interest your columns anent the "Single *v.* Twin," I did not intend to enter the ranks of the inkslingers, who so steadfastly uphold the cause of their particular choice. But "Yorkshireman" in your issue of December 28th has altered my decision.

What he, in common with hundreds of others, does not, or will not, realise is that, quite apart from the type of machine to which it is fitted, or the purpose that machine is required to fulfil, the *gear box of to-day is made to be used!* His phrase, "The rider can almost regard his two lower gear ratios for emergency purposes only," to my mind, entirely spoils his letter.

It might have rung true in the days when so-called "gear boxes" were unreliable, flimsy contraptions, with which one took the risk of a stripped pinion with each change of gear; but the present-day reliable gear box of first-class make—and the "dud" ones are now few and far between—is made just as much to be used as that of a car.

If a car driver hangs on to top he is called chosen names and branded an idiot. Why, then, should a motor cyclist differ?

"Yorkshireman" must realise that the possession of a four-speed gear box brings us one step nearer to the motor car—surely the ideal of the motor cycle designer. Apart from which fact the delight of using intelligently a gear box, as apart from making a machine "a demon for top gear pulling," seems to be realised by a strict minority.

The fact of using one's gear ratios is not—as "Yorkshireman" seems to think—a drawback, but one of the greatest advantages of the motor cyclist. PROGRESS.

Wolverhampton.

KICK-STARTER FOR ZENITH.

Sir,—For some years in South Africa and this country I have been an interested reader of your valuable paper and have come to the conclusion that some one of your many readers will probably be able to help me out of a difficulty.

I have a 6 h.p. Zenith (standard) of, I think, 1912 model, which is somewhat heavy to push in order to start. I have written to the makers asking their views as regards converting the machine to a kick-start and clutch model, but they inform me that the cost of conversion would be too great.

I have no desire to sell my present Zenith, as I cannot afford a new machine. Could any of your readers suggest a method by which I could attach a hand or kick-start, and approximate cost?

I have thought of a new wheel with separate driving pulley and a hub gear, but do not know if I could obtain a wheel with a spindle of 10in. which is required on a Zenith.

I should be grateful to any reader who could help me out of this difficulty. J. HARRY McEWEN.

Nairobi, British East Africa.

ELECTRIC LIGHTING FOR MOTOR CYCLES.

Sir,—I noticed some time ago in *The Motor Cycle* an article on electricity for lighting purposes, which greatly interested me. I have now fitted up head, width, and tail lamps to my sidecar machine. I am running them off a 30 ampère hour ignition accumulator, four volt, which is giving me about fourteen hours light. I have an ordinary head lamp with adjustable holder, in which I run a .5 ampère miniature screw lamp as used in pocket lamps, and have run my width and tail lights in series (2.5 ampères each), so that by looking at the road by my sidecar I can tell if the tail light is in. I have made my own width and tail lamps out of old electric switch lamp holders, and the whole outfit, including the head lamp, has not cost me 30s. I am getting sufficient light to do riding on the N. Wales roads after dark, and until recently have not been troubled with the lamps. I charge my own accumulator at home, so that, with the assistance of your paper, I have rigged up a cheap lighting outfit, which is highly satisfactory.

H. COOPER.

A PLEA FOR SILENT MOTOR CYCLES.

Sir,—One reads and hears a great deal about post-war models of motor cycles. I sincerely hope that the new models will be several times quieter than the average existing model, particularly as far as the single-cylinder is concerned. For many years I have taken a great interest in motor cycles, and am myself an engineer, but I must say that, if I had my way, at any rate, the average single-cylinder motor cyclist should be heavily fined every time he goes out for the abominable noise made from the exhaust of the machine. No doubt a number of motor cyclists will scoff at this idea, but I can assure them that a great deal more harm is done to the motor cycle movement from the noise of the machine than anything else. The average layman speaks of motor cycles as "those noisy things," and for once the average layman is correct. Incidentally, the foregoing remarks are applicable to the correspondence you are publishing, referring to the single-cylinder vertical engine against the horizontal twin, and, if from no other point, the horizontal twin is a vast improvement on the noisy vertical single. A.M.I.E.E.

London.

MUDGUARDING.

Sir,—It is refreshing to see you continually hammering at the manufacturers to produce a better mudguarded machine and so keep the motor cyclist clean when motoring.

I have had a new 4 h.p. single for eighteen months, and the one and only thing I have against it is the front mudguarding. In the winter I fix up my own mud shield and discard it for the summer, but going down to business the other morning after a night's rain I was slushed up to the knees before I had travelled a mile.

It is exceedingly aggravating to have to put up with such crude mudguarding when a better could so easily be adopted without spoiling the appearance of the machine.

I have no alternative but to motor cycle to business, all weathers (five miles), and have decided to try some other make of cycle if the makers of my machine will not give better protection against mud from the front wheel than the system at present used.

Considering the times through which we are passing, your paper loses none of its interest—a great credit to the organising staff. J. RYCROFT.

OUTSIDE FLYWHEELS.

Sir,—Noticing with interest the different letters appearing in *The Motor Cycle*, dealing with the comparisons on flat twins and 500 c.c. single-cylinder engines, I should like to ask a question.

It is generally admitted that the fitting of an outside flywheel on an engine goes a long way towards making it easy starting and smooth running. As the outside flywheel is fitted on flat twins and the greater majority of baby two-strokes, why is it that there are not more 500 c.c. singles similarly fitted?

In Capt. Lindsay's letter in your issue of December 7th he said, "Watch a Blackburne turning over in neutral."

Surely, then, it would be equally advantageous to fit an outside flywheel on similar 500 c.c. singles to remedy the "snatchiness" of drive complained of by numerous riders.

Sherborne. A.H.S.

VALVES AND EFFICIENCY.

Sir,—Engine efficiency is often ascribed to overhead valves, but I do not think that this is always the case. I possess a 1912 3½ h.p. Premier with extra exhaust ports. This I run with a coachbuilt sidecar, and I have taken my wife over Llanberis Pass without a falter during a tour in North Wales—in fact, none of my friends owning 3½ h.p. machines can keep with me, and I can give a 6 h.p. machine "a run for its money." It may be argued that the Premier machine holds no records, but that does not trouble me.

The usual disclaimer. LK 1810.
Peckham.

SIDECAR V. CYCLE CAR.

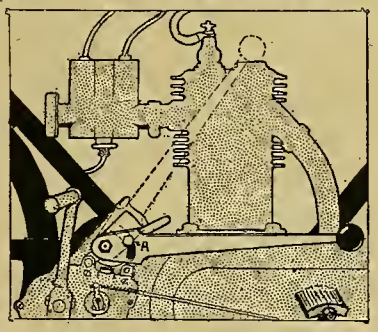
Sir,—After two years of enthusiasm for the cycle car, I have come to consider my old mount—a sidecar combination—the best. There is something far more fascinating about the posture on the saddle and the grip of the bars than sitting down lazily in a car seat. Then, too, the height of the saddle gives a far better view over hedges both of the road ahead and of the scenery around. Again, unless one is settled in a house where one can rig up one's own garage or is near a convenient proprietary garage, the detachability of the sidecar is useful. The possibility for the conveyance of extra passengers at odd times for special occasions is also much better on a sidecar outfit. To improve the sociability, I think of rigging up a special sidecar seating which will decrease bodywork, and so make for increased accessibility, too.

Will your readers kindly give me, c/o the Editor, their opinion of the 3¾ h.p. Scott with sidecar attachment? It so happens I have met this machine but little in close acquaintance. IVOR E. MERCER.

STURMEY-ARCHER GEAR CONTROL.

Sir,—May I point out that all Sturmey-Archer gears can have the gear control position shifted in ten seconds or less to suit either hand or foot control by the mere slackening of a stud? I enclose a sketch of what I mean.

P. J. LINDEN,
Lt., A.S.C., M.T.
B.E.F.



By loosening the stud A the gear change lever of a Sturmey-Archer gear can be adapted to foot control. (See letter from Lt. P. J. Linden, A.S.C., M.T.)

WHY DOES THE ENGINE CARBONISE?

Sir,—May I make a few brief and simple observations on the above subject? Free carbon, for such is the deposit in petrol engines, is found in many forms, such as soot of all kinds, charcoal, graphite, etc., and is the result of decomposition by heat. Large quantities of free carbon, similar to that in question, are found in gas tar. This is due to the decomposition by heat of the tar oils on the hot sides of the retort. It is therefore certain that carbon in petrol engines is largely due to decomposition of the lubricating oil. The more generous the lubrication the greater the deposit.

As regards fuel, the less perfect the combustion (as in the case of a smoking lamp) the more carbon is produced. Most of us are familiar with the black exhaust of a rich, or imperfect, mixture. The colour is entirely due to particles of carbon, and it is only reasonable to suppose that a good deal of it adheres to the piston and cylinder, especially when they are moist through lubrication or imperfectly vaporised fuel.

Conclusions.—The prevention of carbon deposit is impossible. Excessive deposit is caused by (1) over lubrication, (2) too rich mixture principally through reduction of air to prevent knocking, (3) carburetter not adapted to fuel (practically all carburetters are tuned for petrol No. 1), (4) hot engine, and, in the case of petroil engines, (5) the petrol helping to burn the lubricating oil.

If the above suggestions are correct a water-cooled engine will carbonise less rapidly than an air-cooled engine.

"Ixion" and others will be interested to know that I have had a Lodge plug in my Triumph since 1913. It has run well over 20,000 miles and, as far as I can remember, has only sooted up twice. During this time three spares have worn out by friction in the bag. FREE CARBON.
Leicester.

HEATING THE CARBURETTER.

Sir,—Being one of those who take a good deal of interest in the various experiments described by various correspondents in *The Motor Cycle*, I think perhaps one of my own experiences may interest you, more especially as it seems to me rather extraordinary, and a direct contradiction to commonsense and science.

The machine I ride is a heavy 4¼ single-cylinder combination. I have nothing but praise for the behaviour of the engine, often under trying circumstances, and solo the machine is wonderfully fast, without any special tuning, and is very economical in the way of petrol. In pre-war days I used benzole neat, when I could get it. At present I have to use the liquid designated as petrol, but I also use an equal quantity of what is, I believe, a low grade benzole, the addition of the latter being absolutely necessary to bring the present-day No. 1 petrol up to the same standard of pulling power as the old pre-war No. 3.

I may say in passing that I have run on half petrol and paraffin, also on pure paraffin, though the latter was only for short distances, and I don't think much of either.

Long ago I thought of a kind of air scoop to the carburetter, but I did not experiment in that direction until one day a friend of mine suggested an arrangement of that nature to help, if possible, to compensate for the inferior quality of the petrol. I then rigged up a sort of shield to help direct air on the valve pockets and convey the heated air to the carburetter, so that the engine drew hot air not only through the extra air inlet but also through the main air inlet. I took great care that the free passage of air was ensured. On trying the attachment I found no apparent advantage; in fact, I thought it a disadvantage, so I set to work and made another and more perfect attachment, but to my disgust I found the engine ran hot, knocking on the slightest provocation and refusing to take anything but the mildest of hills, and I fancy the consumption went up considerably, but of this I cannot be quite sure. At first I thought that perhaps the cooling of the valve pockets was interfered with by the air scoop or shield, or whatever you may call it, so I removed this, but obtained no better results. I then replaced that portion and removed the tail end so that the engine drew in cold air as usual, with the result that things became normal again, proving that the cooling of the valve pockets was not the trouble.

I may say I was running on petrol only at this time; weather conditions were good, the experiments being made in July and August.

Shortly after this I saw a description in *The Motor Cycle* of an attachment identical with mine fitted to a Triumph, and which gave very excellent results. Now I quite believe it did give good results in the other case, and I know it ought to have given good results in my case, but the fact remains it did not do so. I wonder if any of your readers ever found that their engines run better on cold than on hot air? I may say that on ordinary occasions my engine is not given to running hot.

There has been much writing about heating the induction pipe, and I am sure this is quite right where a long induction pipe is used, but with a short pipe, when the carburetter is close up to the cylinder, surely heating is unnecessary. In my case, after a very short time running the carburetter (a B. and B. of the new type) gets nice and warm, and I am quite sure the petrol is thoroughly vaporised before it gets into the cylinder. When one comes to think of it, surely the petrol must vaporise thoroughly after passing (even in large drops) into a hot valve pocket, and thence through a small circular slit past a hot valve head into a still warmer cylinder. I will admit the time occupied by the petrol in passing from the jet to the cylinder head is very short, but then the passage is very hot, and after all even third grade petrol is a highly volatile substance, or rather liquid.

H. H. BROWNRIGG.

[Owing to the large number of interesting letters received weekly, many have to be held over for want of space. Correspondents are therefore asked to be brief and to the point.—ED.]

THE EXISTING LIGHTING REGULATIONS.

A Review of the Conditions applying to Motor Cycles.

THE lighting regulations with which motor cyclists must conform are now more uniform throughout the country, and are as follow:

If lamps with fronts exceeding 6in. across are used, the fronts must be so covered that light can only pass through a central portion not exceeding 4½in. in diameter. All electric and acetylene lamps (including the central apertures of head lamps reduced as described), and all candle or oil lamps with lens fronts, must be obscured, as at present, with at least one thickness of ordinary white tissue paper or an equivalent medium.

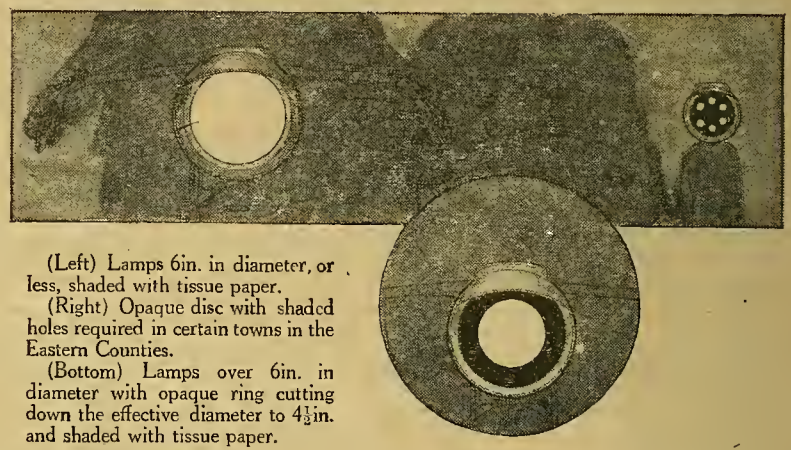
The special restrictions which apply at present in certain towns in the Eastern Counties remain unaltered—that is to say, the disc with six holes must still be used on electric and acetylene head lamps and on oil and candle lamps with lens fronts.

The six holes referred to must be circular, half an inch in diameter, and must be spaced equally around the opaque disc in such a manner that no portion of any of the apertures is nearer the centre of the disc than one quarter the diameter of the effective front of the lamp. Tissue paper or its equivalent must be used to cover the holes.

The area covered in the Eastern Counties by the special restrictions referred to was illustrated in *The Motor Cycle* of January 13th, 1916.

No light of any description on any vehicle which is at a standstill may be visible from the sea or the navigable waters of any estuary.

THE THREE ALTERNATIVE METHODS OF SUBDUING LAMPS NECESSARY ON MOTOR CYCLES.



(Left) Lamps 6in. in diameter, or less, shaded with tissue paper.
(Right) Opaque disc with shaded holes required in certain towns in the Eastern Counties.
(Bottom) Lamps over 6in. in diameter with opaque ring cutting down the effective diameter to 4½in. and shaded with tissue paper.

THE PETROL POSITION IN IRELAND.

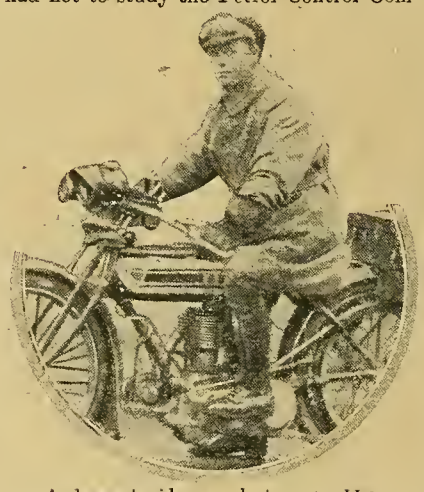
AS a considerable amount of misconception appears to exist in regard to the regulations governing the supply of motor spirit in Ireland, it may be well to set down the present position of affairs for the benefit of local motor cyclists, as well as for those who may visit the country on business.

Briefly, it may be said that the regulations are similar to those in force in other parts of the United Kingdom, but there is the additional requirement that the permits to purchase petrol issued by the Petrol Control Committee must be endorsed by the military authorities.

Previous to the Petrol Control Committee's scheme coming into operation there was a very serious shortage of spirit in Ireland. One day none would be available in Dublin or Belfast. A week later it would be plentiful in both places, while in towns and villages between the two cities not a drop would be obtainable. These periodical shortages were due to the irregularities of the sea-borne supplies, coupled with the fact that the shadow of the coming of the permit system caused every user of the spirit to do his best to secure a supply in anticipation of the possibility of a real shortage.

With the introduction of the permit system in August all difficulties with regard to supply disappeared. Dealers found a reduced demand, and stocks began to accumulate, not only in the hands of the retailers, but also with the wholesale distributers. That state of affairs prevails to the present time, so that the motor cyclist who has a Petrol Control Committee permit, and is in a position to satisfy the military authorities that he has a legitimate use for the spirit, experiences no difficulty in having his permit endorsed and getting all he is entitled to in any town or village in the country.

There is little doubt that in Ireland, as in other parts of the kingdom, a good deal of petrol has been issued since August last that was not authorised by the Petrol Control Committee. The Irishman—as not infrequently persons of other nationalities—often finds a loophole to get outside or around the law, and he had not to study the Petrol Control Committee's system very deeply to find out its weak spot. While he is not authorised to supply motor spirit without the production of a licence, and it is required to enter thereon the amount of spirit supplied, there is no obligation on him to keep a record of his sales, or to enter the amount of spirit he received from the wholesale distributers. There is a recommendation of the Petrol Committee to do so, but recommendations are not always respected.



A despatch rider attached to the Heavy Section, Machine Gun Corps, the section operating the armoured-car Tanks. Harold Hughes, the rider in question, was formerly in the Motor Machine Gun Service, and has seen eighteen months' service.

Military Control.

The need for further control of the petrol supply by the military authorities arose because of the recent rebellion. There was a fear that petrol might get into the hands of persons who would supply it to enemies of the country, and use it for improper purposes, and to prevent this it was considered necessary to have the permits endorsed by the military authorities, who, in turn, delegate their powers to the police. At first this system of having petrol permits vised existed only in a few districts, and these, for the most part, in places where, under any circumstances, it would have been difficult to get any large quantity of spirit. An Order of the Army Council recently issued extends the system to the whole country, and county and district inspectors of the Royal Irish Constabulary and superintendents of the Dublin Metropolitan Police have been authorised to act for the military authorities. It may be added that the Army Council Order does not require the dealer to keep a record of the petrol he sells or gives away—a distinct loopbole in an otherwise comprehensive scheme.

QUESTIONS AND REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C., and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Engine Refuses to take Air.

(1.) As soon as I open the air lever of my 3½ h.p. machine it slows down and stops, unless I open the throttle and go 20 m.p.h. What is the remedy? (2.) Is 4¼ to 1 too high a gear for a 3½ h.p. solo single-speed machine? What should the ratio be? (3.) I cannot run more slowly than 8 m.p.h. What can I do to run at 5 m.p.h.? (4.) Knocking occurs at all speeds with levers in all positions.—L.A.B.

.) The trouble is probably due to air aks at the carburetter or induction pipe nions, or owing to a worn valve guide. ry excluding the air, or fitting a slightly rger jet. (2.) 4¼ to 1 is rather too gh; 4⅜ to 5 to 1 would be better for a ngle-gear machine. (3.) With a single ear you cannot hope to run very much ore slowly than 5-6 m.p.h., firing regurly. (4.) Have you tried cleaning the rbon deposit from the cylinder recently? f course, the knock may be simply ppet noise or noise in the valve gear. such be the case it is incurable. Too uch air is quite likely to cause the ngine to knock, though if the knock continuous it would rather indicate adly-worn engine bearings.

Distribution of Weight on Sidecars.

Will you please inform me as to the correct distribution of weight when fitting a sidecar? I have always been under the impression that the passenger's weight should be over the sidecar axle, although I have noticed on some of the combination outfits that this is not so by any means. In these cases the front attachments are, perhaps, much stronger. I do not want to run the risk of the front attachments giving way for the sake of simplifying the steering a little. As my sidecar is fixed at present, I experience difficulty in taking a right hand turn. Sometimes I can feel the front wheel skidding as it were under the machine. I presume there is a certain amount of drag on every sidecar outfit when taking a right hand turn. What do you consider the best distribution of weight?—E.E.S.

'he weight distribution of sidecar bodies a knotty problem. The sidecar body laced too far over the sidecar axle auses poor steering, while if placed too ar forward throws great strain on the ront connection and bicycle frame and orks. If the machine is sufficiently trong and connections are stout the forward position is perhaps preferable. Of course, a happy medium is what is wanted, and exactly the best position can only be arrived at by personal experiment. Unfortunately the natural design of a sidecar outfit is such that there is always a tendency for one wheel to drag sideways. If carefully lined up it is the front wheel of the bicycle which will scrape. This, of course, affects the steering. The best plan is to line up in such a way that the sidecar wheel is running *slightly* toward the machine. This gives better all-round steering and less side pull, while the extra wear on the sidecar tyre, caused by the tendency to scrape, is less than it would be on the steering wheel when the sidecar is lined up absolutely parallel.

Sparking Plug Position.

When I first purchased my 1914 second-hand single-cylinder the sparking plug was over the exhaust valve. Later on, when adjusting the engine after starting difficulties, I changed it over to the inlet port, after looking at a sketch on the cover of "Motor Cycles and How to Manage Them," which showed the plug in this position. Now, after again adjusting the engine to locate a mysterious misfiring, and "blowing back" through the carburetter, I have moved the plug back to its old position over the exhaust, and for the first time have noticed a marked increase of speed and power and absence of misfiring. What is the correct position for the plug, and am I wise in placing it over the exhaust valve?—H.S.M.

There is no doubt that the proper place for the sparking plug is over the inlet valve. If placed over the exhaust valve it is subjected to too much heat. The symptom which you describe is, in our opinion, quite inexplicable. It may be accounted for by the fact that the gas which passes the plug points when situated over the exhaust is drier than that which passes the inlet valve position. There is no doubt that the plug should behave better over the inlet valve. However, if it answers better over the exhaust valve there is no harm in leaving it there, provided you do not eventually burn out the points. It is doubtful whether your plugs will last any length of time.

SPORTSMEN'S USE FOR A MOTOR CYCLE.

A buck brought down within twenty miles of Duluth, Minn., as the result of a three-hour hunt. The motor cycle and sidecar have become very popular with sportsmen in the States, as the machine enables them to reach the hunting grounds easily, while the sidecar serves to transport their equipment to the woods and the game back to the city.

Pre-ignition.

(1.) I recently purchased a 1913 3½ h.p. Humber motor cycle and sidecar, and have been using petrol substitute, and have been troubled considerably with irregular running and overheating. The engine invariably stops after about two miles, behaving as if it had seized, but it will always start up immediately afterwards. What is the cause of this? I do not think it can be through want of oil, as I have been rather over-oiling. I have also had the carburetter down and cleaned it thoroughly. (2.) Ought the low-speed pedal of the Roc two-speed gear to "catch on" similarly to the high-speed pedal?—W.G.W.

(1.) It looks as if the trouble were not due to the use of petrol substitute at all, but to the plug causing pre-ignition. Use a good single or double-point plug with fairly substantial electrodes. To obtain good running with petrol substitutes the air entering the carburetter should be warmed, and the engine should be perfectly clean inside. Make sure the piston rings are free in their grooves. (2.) No, the low-speed pedal is kept in engagement merely by the pressure of the foot.

Gear Adjustments.

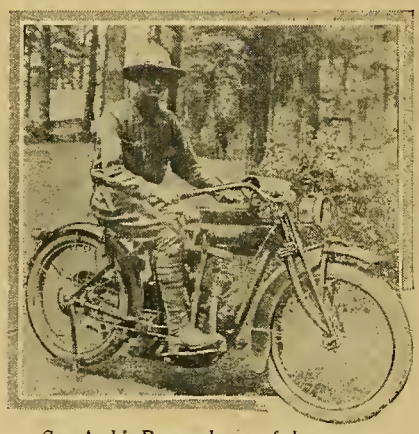
I have a 1910 Triumph fitted with N.S.U. gear. It seems difficult to get any information on the overhaul, adjustment, and care of these gears. Owing to the big number of N.S.U. gears on the road, the information you could no doubt give would be of great value. (1.) Is the centre keyway in the shaft for adjustment purposes? If so, how is it adjusted? (2.) How is the pulley adjusted? (3.) Is sperm oil right for lubricating? (4.) How can I prevent "racing" of the engine on top gear at speed? Up to 15 m.p.h. everything is right, but above this "over-running" seems to set up. I do not think it is belt slip.—E.G.L.

(1.) We take it when you speak of the "centre keyway" that you mean the square hollow in the centre of the gear shaft behind the operating bar? If so, this is not for adjustment. It is simply the continuation to the nut that secures the whole gear to the engine-shaft. It is done up or undone and the gear removed or fixed by means of the square projection on the special spanner usually supplied with the gear. (2.) If the pulley is of the adjustable pattern the back flange is the adjustable one, and is locked by means of a locking flange. This has to be slackened, probably by means of a hammer and punch. The flange can then be screwed either in or out for expanding or contracting the pulley. (3.) Ordinary engine oil is best, and should be injected through the hole closed by a screw provided for the purpose on the side of the gear. (4.) The following are usually the causes of top gear slip on these gears: *(a)* Top gear cone worn and bottoming; remedy, new top gear cone clutch. *(b.)* Main spring weak, requiring renewal. *(c.)* Operating bar too tight a fit, and preventing the top gear clutch going fully into engagement. When the gear lever is screwed fully into top gear the operating bar should be quite free, and it should be possible to turn it round or swivel it easily with the fingers, that is, there should be clearance between it and the operating fork. If this is not so it is holding the gear out slightly, and requires reducing a little in size, or the operating fork grinding so as to give clearance when the top gear is engaged. This is a very common trouble. By operating bar we mean the small crosshar on which the operating fork wedges. Try washing out the gear with paraffin, and filling it with fresh thick oil. Make sure the belt is not slipping.

High Petrol Consumption.

Recently I purchased a 1911 3½ h.p. Triumph, and find that I can only run thirty miles on one gallon of petrol. This is my first motor cycle, therefore, as a new reader, I seek your advice. (1.) Would a smaller jet cure this? (2.) Is there anything else that would cause this excessive use of petrol? The tank and connections are quite tight. The late owner informed me that the machine was very low geared. (3.) From what points on the pulley and belt drum do I measure to get the gear ratio?—W.R.B.

(1.) A smaller jet should cure the trouble. Also go over the petrol system carefully, and eliminate all chances of leakages at the unions, filler caps, carburetter joints, etc. (2.) Of course, if the machine were low geared, this would help to account for the high consumption. To obtain really good consumption, the whole machine needs to be in really good order. Go over the engine, and see that the valves are in good order and the compression good. In driving, always give as much extra air as the engine will take, and keep the spark as far advanced as possible. (3.) Simply leave the belt in position, jack up the back wheel, turn it round, and count the number of revolutions the engine pulley makes to one revolution of the rear pulley, and this will give you the gear accurately.



Sgt. Archie Roosevelt, son of the strenuous Theodore, as despatch rider at the business men's training camp, Plattsburg, N.Y. Our American cousins are not slow to adopt the useful lessons of the great war, judging from the extensive orders recently placed for motor cycles for despatch carriers, machine gunners, etc., not to speak of orders for armoured cars and aeroplanes.

READERS' REPLIES.

Kidderminster to Selsey.

I noticed in a recent issue of *The Motor Cycle* that you gave a route from Kidderminster to Selsey, in which you advised going through Bishop's Waltham, Fareham, Cosham, etc. I consider it would be better and much shorter to go from Winchester to Petersfield, and thence through Midhurst, Cocking, Singleton, Lavant, and Chichester. The roads are in good order considering the time of year; moreover, the run would be much more pleasant.—BK 3075.

Refusal to take Extra Air.

I think "G.E.C.'s" trouble is certainly in the tappets, for exactly the same thing happened to my 1911 3½ h.p. single, only in this case the tappet adjuster had dropped off, thus leaving far too much clearance, so that the valve was losing nearly half its lift. I hope this may be helpful to "G.E.C."—MALCOLM G. HALLOWES.

Slip in an Enfield Gear.

I am interested in the question and reply to "E.A.F." in the issue of December 28th, and rather fear your explanation is not quite what "E.A.F." wants, because you dismiss the vital point in exactly the same way as the Enfield Co. In their book of instructions it is said that, after removing the thrust bracket, "the cam can easily be pulled out." This, however, is not always the case, and I think "E.A.F.'s" trouble is that he is afraid to strain something by forcing. Even when the low gear is engaged to its fullest extent the cam is still gripped by the actuating peg and needs force to release it. If "E.A.F." will insert a screwdriver behind the face of the thrust bracket he will find this gives just sufficient extra pull on the low gear to release the cam.—W. KAY.

RECOMMENDED ROUTES.

WELLINGBOROUGH TO GOLDER'S GREEN.—G.W.C.

Wellingborough, Olney, Newport Pagnell, Hockliffe, Dunstable, St. Albans, Barnet, Finchley, Golder's Green. Approximately 65 miles.

BIRMINGHAM TO WINDSOR.—P.C.K.

Birmingham, Warwick, Gaydon, Banbury, Bicester, Aylesbury, Wendover, Amersham, Beaconsfield, Slough, Windsor.

WOOL TO BRISTOL.—A.

Dorchester, Cerne Abbas, Sherborne, Wincanton, Bruton, Shepton Mallet, Binegar, Pensford, Bristol. Approximately 90 miles.

BRIDGWATER TO HORSHAM.—W.H.P.R.

Bridgwater, Glastonbury, Shepton Mallet, Frome, Warminster, Heytesbury, Amesbury, Stockbridge, Winchester, Petersfield, Midhurst, Petworth, Horsham. Distance approximately 150 miles.

SHEPHERD'S BUSH TO TINTAGEL.—W.A.

Shepherd's Bush, Brentford, Hounslow, Staines, Bagshot, Camberley, Basingstoke, Andover, Amesbury, Hindon, Wincanton, Ilchester, Ilminster, Chard, Honiton, Exeter, Okehampton, Launceston, Piperspool, Camelford, Tintagel.

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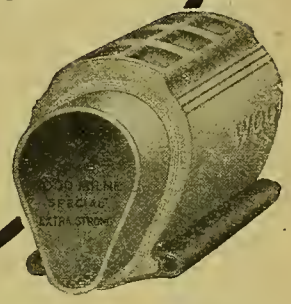

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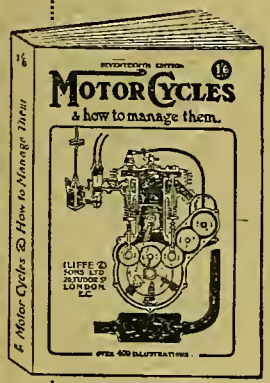

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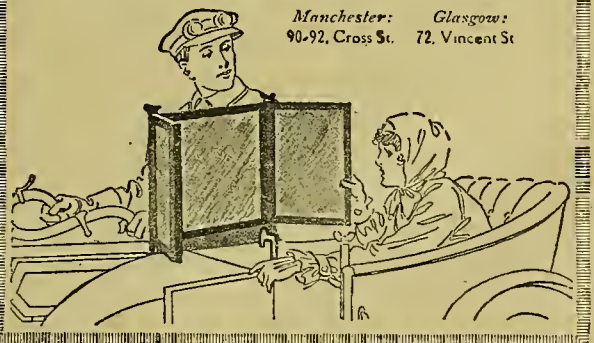

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All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

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MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Spares prompt delivery.—Cyril Williams, A.J.S. Agent, Chapel Ash Depot, Wolverhampton. [X4090

A.J.S., 1913, 6h.p., coachbuilt sidecar, fully equipped, perfect condition; 40 gns.—283, Camberwell Rd., Camberwell. [7161

A.J.S. Lightweight, 2-speed, clutch, recently overhauled, climb anything; £27, or near offer.—Rev. Owen, Rolleston, Burton-on-Trent. [X4471

1916 6h.p. A.J.S. Combination throughout, interchangeable wheels, unpunctured, Lucas fitments, condition guaranteed; £95.—20, Redlam, Blackburn. [X4254

A.J.S., 1913, 6h.p., 3-speed countershaft, and hand control clutch, Mills-Fulford coachbuilt sidecar, perfect condition; £50.—Montgomery, Victoria Rooms, Bristol. [X4256

A.J.S., 1915, 3-speed, kick start, hand clutch, new tyres, all accessories; £44/10; deferred payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [7227

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

RIDER TROWARD, 78, High St., Hampstead.—1916 Alldays Allon, 2-speed; cost over £40, 29 gns. [7323

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10847.	3½	1915	2-sp. **NORTON**	£65 0
10850.	1	1915	single-speed **J.E.S.**	£15 0
10852.	5-6	1913	2-sp. **A.C.** Sociable	£37 10
10854.	2½	1915	2-sp. **ALLON**	£30 0
10856.	9-4	1915	3-sp. **SAXON** Light Car	£120 0
10857.	4	1913	s-sp. **BRADBURY** & S/c.	£25 0
10858	3½	1910	single-speed **HUMBER**	£12 0
10860.	2¾	1913	2-sp. **DOUGLAS** & S/car	£30 0
10861.	3½	1915	3-sp. **JAMES**	£52 10
10862.	4½	1915	3-sp. **QUADRANT** & S/c.	£45 0
10899.	2½	1916	3-sp. **SUNBEAM** & S/car.	£85 0
10824.	3½	1913	3-speed **TRIUMPH**	£37 10
10826.	3½	1911	2-speed **HUMBER**	£20 0
10831.	5-6	1915	2-sp. **FAFNIR** and Sidecar	£32 10
10786.	2¾	1911	Single-speed **HOBART**	£20 0
10789.	8	1914	**HUMBERETTE**	£75 0
10794.	4-5	1914	**ZENITH** Gradua	£42 10
10795.	3	1914	2-sp. **ROYAL ENFIELD**	£42 10
10802.	4½	1915	3-speed **B.S.A.**, chain-cum-belt	£52 10
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10705.	12-16		**VAUXHALL** Car	£125 0
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10682.	3½	1914	3-sp. **BRADBURY**	£47 10
10687.	1½		single-speed **J.E.S**	£10 0
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10661.	6	1913	**ENFIELD** and Sidecar	£45 0
10673.	4½	1914	3-sp. **B.S.A.** and Sidecar	£45 0
1061 .	2¾	1914	3-sp. **NEW HUDSON**, Sc.	£45 0
10514.	3½	1911	single-speed **HUMBER**	£25 0
10629.	3½	1914	3-sp. **ROVER** and Sidecar	£50 0
10633.	4	1914	3-sp. **SINGER** and Sidecar	£45 0
10587.	3½	1914	3-sp. **QUADRANT** & S'car	£42 0
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MOTOR CYCLES FOR SALE.

Alldays.

ALLDAYS Matchless, 1913, 3½h.p., Bosch mag., Sen spray carburetter, fast machine, good condition trial appointment; £23.—The Den, Laleham, Middlesex [7141

1915 Allon 2-stroke, 2 speeds, splendid condition cash offers; consider late combination or high car exchange.—Clapham, jun., King George St., Greenwich. [X4627

ALLON.—All 1917 models in stock, 36-45 gns.; exchanges and deferred payments arranged.—Maudes' 100 and 136 Gt. Portland St., London, W. Tel.: 55 Mayfair. [7387

ALLONS, all models actually in stock, £37/15 to £47/5; exchanges, deferred payments; also 1915 single speed 2-speed clutch model, £36/10; also 1915 single speed £27/10.—Lamb's, 151, High St., Walthamstow, and 50 High Rd., Wood Green. [7230

Ariel.

1916 5-6h.p. Ariel Combination, very fine condition £75.—Address below.

1916 3½h.p. Ariel and C.B. Sidecar, guaranteed not done 500 miles; owner in army; condition a new.—Watson, 30, Harvist Rd., Queen's Park. [7204

ARIEL, 3½h.p., latest 3-speed model, actually in stock.—Crow Bros., Guildford. [6366

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

3½h.p. Ariel Motor Cycle, mag., running order; £8, or first cash offer.—Snow, Rothley Rd., Mountsorrel, Loughborough. [X4611

ARIEL, 1917, 3½h.p. machine actually in stock £65/10; deferred payments if desired; exchanges.—Lamb's, 151, High St., Walthamstow. Tel.: Walthamstow 169. [7226

Auto-Wheels.

AUTO-WHEEL, 1915, unscratched; 10 gns.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester [7186

FOUR Nearly New Auto-Wheels, late models, splendid condition, complete, from £7 to £10 each.—Murray's, 37a, Charles St., Hatton Garden, Holborn. [X4627

AUTO-WHEELS (two), second-hand B.S.A. model in stock, £9/15, and 12 gns. each; deferred payments if desired.—Lamb's, 151, High St., Walthamstow and 50, High Rd., Wood Green. [7224

Bat.

BAT-J.A.P., 1914, 4-5h.p., coach combination, Touring Trophy model, 3-speed, and kick start, in perfect condition; £45.—H. Blaker, 13a, Kirkdale, Sydenham 'Phone: 55. [7277

Bradbury.

BRADBURY, 1911, 3½h.p., in real good order, £13; another, fitted with N.S.U. 2 speeds, £17.—Percy and Co., 337, Euston Rd., London. [7405

1913 Bradbury Motor Cycle, Armstrong 3-speed, free engine, Bosch mag., B. and B. carburetter, lamps, tyres as good as new, will climb anything, in perfect order, also sidecar (adult and child); £35.—Firth 51, St. Heliers Rd., Blackpool. [X4551

BRADBURY, 1913, 4h.p., new coachbuilt sidecar, 2 speed, free engine, Binks 1916 3-jet carburetter overhauled and re-enamelled last June, Bosch mag., Stewart warning signal, P. and H. lamps, nearly new tyres, excellent condition; £28.—Burnisfon, 80, Horton Grange Rd., Bradford. [X4626

MOTOR CYCLES FOR SALE.

Brough.

BROUGH, 5-6h.p., 3 speeds, and sidecar; cost Dec., 1915, £85, take £48; leaving for France next week. Col. Bland, 65a, Rosendale Rd., Dulwich. [7256

BROUGH, 3½h.p., 1916, done 1,500, electric lighting, long copper exhaust pipe, tyres unpunctured, a splendid condition; £45, or nearest.—56, The Grove, Ealing, W. [7123

Brown.

RIDER TROWARD, 78, High St., Hampstead.—1912 3½h.p. Brown, re-enamelled, overhauled; 5 gns. [7324

B.S.A.

B.S.A., 1917 models H and K, with sidecars, in stock.—Moss, Wem. [X4657

HOLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A., 1916¾, mileage 750, £56; sidecar, £2/10.—127, Ivor Rd., Sparkhill, Birmingham. [X4622

RIDER TROWARD, 78, High St., Hampstead.—1915 T.T. clutch B.S.A., mileage 3,000; 33 gns. [7315

GRATE 1913 B.S.A., 2-speed, Montgomery sidecar, guaranteed perfect; £36.—20, Whitley St., Reading. [7426

B.S.A., 1913, 3½h.p., free engine, in real good order and condition; £21.—Percy and Co., 337, Euston Rd., London. [7413

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B.S.A., latest 4¼h.p., chain-cum-belt model; £64; easy purchase terms if desired; exchanges entertained.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., London, S.W. [7215

1915 B.S.A., 4¼h.p., 3-speed, clutch, kick start, with smart coachbuilt sidecar and the usual accessories; £57/10. Lightweight wanted.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [7361

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DOUGLAS, 1912, clutch, 2-speed, kick start, little used.—6, Chatsworth St., Derby. (D) [X4557

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ROYAL Enfield 2-stroke, very good order, complete with lamps and speedometer; £28.—W. Wilkes, Castle Foregate, Shrewsbury. [X4630

6h.p. Royal Enfield 1913 Combination, in very fine order; £45.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [7396

1914 Enfield Twin, 2¾h.p., 2 speeds, kick start, perfect condition; exchange 2½h.p. Imperial.—Osborne, 7, Harpur St., Bedford. [7281

ENFIELD 1917 6h.p. Combination, latest model, just arrived from works; 90 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7170

ENFIELD 3h.p. Twin, new 1916, excellent condition, complete accessories; owner in France; 35 gns.—Seen 123, Queen's Rd., Finsbury Park, N. [7303

1915¼ 6h.p. Enfield Combination, speedometer, horn, lamps, only run 1,500 miles.—Best offer to Walters, Grasmere, Eversley Rd., Sketty, Swansea. [7181

ENFIELD 3h.p., 1917, latest model, just arrived from works, 55 gns. We are Enfield specialists.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7169

ENFIELD Combination, 6h.p., 2-speed, with dynamo lighting set, splendid outfit; bargain, £78.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0491

ENFIELD 1917 2-stroke, 2-speed, and free engine, chain drive, very latest model, just arrived from works; £44/2.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7172

ENFIELD Combination, 90 gns.; 3h.p. twin, £57/10; 2-speed, 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

RIDER TROWARD, 78, High St., Hampstead.—1913 Enfield coachbuilt combination, good order, 39 gns.; 1914 Enfield, underslung coachbuilt sidecar, mileage 5,000, exceptional condition; 55 gns. [7316

1916 Enfield Combination Model de Luxe, Lucas dynamo and lamps, Watford speedometer, six months old, mileage under 2,000; 95 gns., or nearest offer.—Robinson, Troughton House, Cleator Moor. [7244

ENFIELD 6h.p. Combination, late 1916, speedometer, lamps, tools, indistinguishable from new, new, silent and powerful, and guaranteed perfect throughout; £75, accept Douglas or Triumph part.—280, Camberwell Rd., S.E. [7045

ENFIELD 1914 6h.p. Combination, splendid condition, 3in. tyres, lamps, horn, many spares; £55; seen evenings after 7, Saturday afternoon or Sunday by appointment.—Challis, 11, Allfarthing Lane, Wandsworth. [X4617

ENFIELD Coach Combination, 1913, very completely fitted, good condition, 42 gns.; also luxurious limousine sidecar body, completely enclosed, detachable top, used twice, bargain, £6; offers, exchanges.—8, Connop Rd., Enfield Wash. [X4253

3h.p. Enfield Combination, T.T. model, fast, and in excellent condition, new sporting coachbuilt sidecar, electrically equipped, had no use since August, as owner on active service; £45; first cheque over £40 secures bargain.—Hicks, Lanoy, Athelstan Rd., Exeter. [X4661

ENFIELD 6h.p. 1917 2-seater Combination, £97/10; 3h.p. solo models, T.T. touring, £57/15; actually in stock; good prices offered for up-to-date machines in part exchange; deferred terms if desired. Also 1916 6h.p. dynamo lighting combination, unscratched, £95; 3h.p., 1916, ridden 2,000 to 3,000 miles, £45/10; 1916 commercial combination, new 2 months ago, ridden 400 miles, £87/10, all accessories; and two 1916 standard outfits, condition perfect, £84 and £85, really fine goods.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169, and Hornsey 1956. [7229

Excelsior.

EXCELSIOR, 8h.p., 1914, racing sidecar; £50.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7189

MOTOR CYCLES FOR SALE.

Excelsior.

19 16½ Excelsior (British), 2¾h.p., 2-stroke, 2-speed combination, new condition, climb anything; £40. —27, Lanimar Park Rd., Ealing. [7334

F.N.

F.N., 1913, 2½h.p., clutch, ridden very little, original tyres; £22/10.—Turner, 55, Pemberton Rd., Harringay, N. [X4633

4-CYL. F.N. Motor, less magneto, carburetter, tyres, frame and engine splendid order; bargain, £6.—Nixon, Brampton, Cumberland. [X4624

F.N., 5-6h.p., 2-speed, with sidecar, £22; also 5-6h.p. F.N. clutch model, £16; both have good tyres, and perfect condition; trial.—R.H., 162, Heath Rd., Twickenham. [7327

F.N., 4-cyl., in excellent condition, with coachbuilt sidecar; best cash offer taken; exchanges and terms entertained.—Clark and Co., Motor Engineers, Doncaster. 'Phone: 176. [7233

Harley-Davidson.

HARLEY-DAVIDSON, 6h.p., 1913, 2-speed, only used about 2,000 miles; lowest £33.—Boyce, Archway Rd., Highgate. [7344

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for immediate delivery of Harley-Davidsons. Spares, 24 hours' service. [6244

19 16 7-9h.p. Harley-Davidson, electrically equipped, dynamo lighting, indistinguishable from new, done 900; £80.—20, Whitley St., Reading. [7429

HARLEY-DAVIDSON 1916 Models delivered from stock on the best terms for cash, exchange, or easy payments; sidecars in stock to fit.—Below.

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LATE 1915 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0861

19 15 Harley-Davidson, 11F, excellent condition, fully equipped, £58; also 10 gallons of best grade oil, 30/-.—Batstone, 1, Queen Mary's Rd., Coventry. [X4639

HARLEY-DAVIDSON, practically new, complete with full range of Lucas accessories and Klaxon, fully guaranteed; 70 gns.—Colmore Depot, 31, Colmore Rd., Birmingham. [7425

19 15 Model 11B 4½h.p. Harley-Davidson, single-cyl., free engine clutch, with hand and foot control, kick starter, 28×3in. tyres, Stewart speedometer, lamp, horn, and tail lamp, good condition; £32.—The Premier Motor Co., Aston Rd., Birmingham. [7298

HARLEY-DAVIDSON, 1916 model 16F, and Canoelet sidecar, wind screen, big F.R.S. lamp, Stewart horn, ridden 600 to 700 miles, really good thing; £89/10; deferred payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green Tels.: Walthamstow 169, and Hornsey 1956. [7228

Hazlewood.

19 14 5-6h.p. Hazlewood and Bramble coach sidecar (under 3,000); nearest £50 for quick sale.—Bland, Devonshire Hall, Morecambe. [X4508

Henderson.

RIDER TROWARD, 78, High St., Hampstead.—1915 Henderson, dynamo lighting, separate mag., Bramble 20 gn. sidecar, mileage 2,000, as new; cost £112, 65 gns. [7318

Hobart.

HOBART 2-stroke, 2½h.p., 2-speed, only done 60 miles, unscratched; seen on appointment; owner on war work; cost £40.—Offers to B., 18, Avenue Rd., Brentford, W. [7202

19 16¾ Hobart Combination, Mills-Fulford sidecar, 4 h.p. J.A.P., 3-speed Sturmey-Archer, Brampton forks, speedometer; owner bought car; offers.—J. Reardon, Frankfort St., Birmingham. [7157

Humber.

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882

HUMBER, 1913, 2-speed, handle start, and sidecar; £25.—29, St. Leonard's St., Bow. [7377

HUMBER, 3½h.p., 1912; £14, offer; running order.—Horner, 57, Foregate St., Worcester. [X4582

19 14 3½h.p. 3-speed Humber, lamp, etc.; £35; easy or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863

19 13-14 3½h.p. Humber, Roc improved 2-speed gear decompressor, and sidecar; £28.—80, Bispham Rd., Southport. [X4101

19 17 3½h.p. Humber, horizontally opposed twin, 3-speed and clutch; £75.—Wilkin and Co., Hunter's Bar, Sheffield. [X4596

19 17 6h.p. Water-cooled Humber, horizontally opposed twin, 3-speed and clutch; £89/5.—Wilkin and Co., Hunter's Bar, Sheffield. [X4595

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HUMBER, 1915, 3½h.p., 3-speed, nearly new; special price, £57/10.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0842

3½h.p. Humber Engine, Chater-Lea frame, mag., 32 torpedo tank, 1916 torpedo sidecar, perfect; £18. —J.R., 234, Southwark Park Rd., Bermondsey, S.E. [7431

19 12 3½h.p. 2-speed Humber, F.E., perfect throughout, 1916 B. and B.; seen after 6 p.m.; £26, or near offer.—473, Lordship Lane, Dulwich, London, S.E. [7203

HUMBER Lightweight, 1913-1914, appearance as new, been very little used, in good order, all accessories, 35/- lamp set, also spares; £14.—4, Bernie St., Putney, S.W. [7177

19 13 Humber, 3½h.p., 2-speed, F.E., lamps, tools, etc., new Dunlop heavies, with Canoelet coachbuilt sidecar, all in splendid condition; bargain, £25.—68, Owston Rd., Carcroft, Doncaster. [7278

Indian.

19 14 Electrically-equipped Indian Combination, very fast; £45.—20, Whitley St., Reading. [7428

INDIAN Combination, just been overhauled and enamelled; £38.—Sleck's Garage, Stockport. [X4506

INDIAN 1916 Powerplus Combination, run 80 miles only, equals new, fully equipped; cost £120, accept £90.

INDIAN, 1915, 5h.p., 3 speeds, kick starter, Swan sporting sidecar; 50 gns.

INDIAN, 1915, 3½h.p. twin, 3 speeds, almost new; £40.

INDIAN, 1915, 7-9h.p., equals new; £45.—Percy and Co., 337, Euston Rd., London. [7412

GENUINE Bargain.—1916 7h.p. T.T. Indian, as new; £37/10; fully equipped.—24, Tudor Gardens, Barnes. [7333

7-9h.p. Indian and sporting sidecar, perfect; £30, or nearest offer.—Shop 2, Southwood St., Crewton, Derby. [7125

INDIAN, 1915, 5h.p., 3-speed, with racing torpedo sidecar, sporting combination, good condition; £60. —Below.

INDIAN, 1915, 5h.p., 3-speed, semi-T.T. bars, electric lighting, splendid condition; £50.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0480

19 15 Indian, 3½h.p., 3 speeds, kick start, clutch, sporting sidecar; offers.—Locke, c/o Claytons Garage, Wellington, Surrey. [7401

19 14 T.T. Indian, lamps, horn, speedometer, complete, splendid condition; £35, or exchange lightweight.—G. Cox, Cross, Stroud. [7142

INDIAN (1916 model), nearly new spring frame combination; cost £102 sacrifice £58 for cash, bargain. —Smith, Institute, Moolton, Tidworth. [7185

INDIAN, 7-9h.p., 1914, clutch model, recently overhauled; £27; must sell.—Reynolds, 6, Stonebridge Cottage, Davington, Faversham, Kent. [7147

INDIAN, 1914, 7-9h.p., C.B. sidecar, 2 speeds, spring frame, usual accessories, excellent condition; £45 —Ince, 70, Longthorne St., Fulham Palace Rd., S.W. [7210

3½h.p. Twin Indian, 1915, and sporting wicker sidecar, good Dunlops, tools, lamps, and horn; £42, or near offer.—2nd Lt. Bowen, Signals, Dunstable, Beds. [7365

19 16 Indian, 5h.p., 3-speed gear, clutch, and kick starter, lamps, horn, and all accessories, only run 1,500 miles, as new; offers.—R. Bamber and Co., Ltd., Birkdale, Lancs. [7363

LATE 1915 7-9h.p. Indian and 20 gn. sidecar to match, 3 speeds, electric lights and horn, only done 2,000, in splendid condition, like new; £64.—Oxton Cycle and Motor Works, 1, Village Rd., Birkenhead. [7154

19 15-16 Indian 7h.p. Combination, 3-speed, electric lighting, spring frame, hood and screen, in good order; £75, or exchange lower power and cash.—F. Wardle, Aberford Rd., Woodlesford, Leeds. Tel.: 48 Rothwell. [X4589

Ivy.

IVY, 2½h.p., late 1913, 2-stroke, new back tyre; £19. —J. E. Jones, Min Afon, Glan Conwy, N.W. [X4558

19 15 Ivy, 2½h.p., 2-speed, 2-stroke, tyres and belt practically new; £24.—Montgomery, Victoria Rooms, Bristol. [X4258

IVY 1916 2-speed Model de Luxe, spare tank fitted, Lucas lamps, horn, speedometer, as new; £28/10. —The Walsall Garage, Walsall. [7271

IVY de Luxe Model, 2-stroke, 2-speed, with kick starter and clutch, just delivered; £44/10.—W. Wilkes, Castle Foregate, Shrewsbury. [X4629

James.

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803

19 16 James, 2¼h.p., 2-speed, 2-stroke, Lucas lamps, Stewart horn, Stewart speedometer, good kit of tools, in excellent running order; any trial given; £38. —A. Coton, jun., 11, Binnie St., Gourock, Scotland. [X4571

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2¾h.p. Kerry, less battery, engine like new, vertical; £5.—80, Bispham Rd., Southport. [X4100

Kynoch.

1914 Kynoch-Jap, 3-speed S.A. hub gear, clutch, 4 h.p., new tyres; £35.—Baker, 10, Church St., Baldock, Herts. [7129

Levis.

LEVIS, latest, brand new, single and 2-speed models in stock.—Moss, Wem. [4658

2¼h.p. Popular Levis, 2-stroke, Sept., 1916, scarcely soiled; £26.—Miss J. Shanks, Downham, Norfolk. [X4498

LEVIS Popular, 1917 model, absolutely new, uncrated; 28 gns.—L.A., Leslie's Cafe, Bognor. [7332

1915 2½h.p. 2-speed Levis, Lucas lamps and horn; £27.—Wilkin and Co., Hunter's Bar, Sheffield. [X4602

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804

LEVIS.—Three 1917 Popular 2¼h.p. models, ready for immediate delivery; £32 each.—The Walsall Garage, Walsall. [7270

LEVIS, 1916, 2-speed, only done 400 miles; £24/10, or close offer.—Taylor, 1, Gorringe Terrace, Tooting Junction. [7282

LEVIS Popular, 1917 letest model, just arrived from works; £32.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7175

1917 Popular and Model E Levis, delivery from stock; cash or easy terms.—Wilkin and Co., Hunter's Bar, Sheffield. [X4600

LEVIS Popular Model, new, but slightly shop-soiled; special bargain, £29/17/6.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7176

1916 Levis Popular, variable ignition, used 4 months only, full tool kit, condition perfect; £25.—Hemingway, Far Forest, near Bewdley. [X4635

LEVIS Popular Model, £32; Levis de Luxe, Royal Enfield 2-speed, 26in. wheels, £47/10; in stock; easy purchase terms if desired.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., London. [7214

Lincoln-Elk.

LINCOLN-ELK, 1911, 3½h.p., Bosch, good tyres, belt, etc., good order; £12, or near offer.—Watts, Arnside, Westmorland. [X4565

Martin.

RIDER TROWARD, 78, High St., Hampstead.—1914 Martin-Jap, record breaker, 64 m.p.h., overhead valves, as new; 25 gns. [7317

MARTIN-J.A.P., 1914, 4h.p., 2 speeds, free engine, condition as new, spares, and accessories; £25.—Law, Police Section House, Wren Rd., Camberwell. [7137

Matchless.

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MATCHLESS 6h.p. C.B. Combination, condition like new; £52.—Slack's Garage, Stockport. [X4505

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MATCHLESS, 1914 model 8B, 7h.p., 3-speed, with new Matchless Canoelet sidecar, 2 lamps, horn, £73/10; also 1912 6h.p. combination, £29/10; deferred payments if desired.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [7221

Moto-Reve.

MOTO-REVE, 2h.p., mag., all h.b.c., good climber; £8/10.—Butlin, The Bungalow, Golleywood, Chelmsford. [X4588

New Hudson.

1913 3½h.p. New Hudson, 3-speed, and coachbuilt sidecar; £32.—Wilkin, Hunter's Bar, Sheffield. [X4599

NEW Hudson, 2-stroke, 1916 model, good as new; cost £33, accept £22/10.—The Walsall Garage, Walsall. [7266

NEW Hudson Combination, 3½h.p., lamps, horn, tools, etc., new tyre on rear; £31.—Walsall Garage, Walsall. [7268

1915 New Hudson War Model, 4h.p., 3-speed, with coach sidecar; bargain, £55.—Lieut. Bird, 27, High St., Doncaster. [X4573

NEW Hudson, 2¼h.p., 2-speed, 2-stroke; £38.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0840

NEW Hudson, 3-speed, kick start, and coachbuilt sidecar; £32, genuine bargain.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7195

NEW Hudson, 1915 (December), 2¼h.p., 2-stroke; £16; must sell; owner ordered to Front.—Gerard, Rifle Brigade, Queenborough, Kent. [7384

1915 2½h.p. New Hudson Lightweight, 2-speed countershaft gear, 26×2in. Dunlop studded tyres, Bosch waterproof mag., footboards, in perfect condition; £27.—The Premier Motor Co., Aston Rd., Birmingham. [7299

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IMPERIAL-J.A.P., 1916, 2-speed, perfect; £43.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7191

RIDER TROWARD, 78, High St., Hampstead.—1915-16 New Imperial, 2-speed, mileage 2,500, as new; 27 gns. [7320

NEW Imperial-Jap, 1916, 2¾h.p., 2 speeds, splendid condition; sacrifice £26/10.—436, Whitehorse Rd., Thornton Heath. [7378

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for Imperial-Jap, the finest lightweight on the market; delivery from stock. [6246

NEW Imperial, 1916, 2-speed, with speedometer, lamps, etc., new tyres, in excellent condition and running order, almost new; £28.—Lieut. Lockwood, 21, Avenue Rd., Brentwood. [7136

NEW Imperial, 2½h.p., 2-speed model, £40/10 2-speed, clutch, and kick starter model, £48/6; easy purchase terms if desired; exchanges entertained.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., London, S.W. [7212

Norton.

1916 3½h.p. Norton, all chain, 3-speed countershaft, lamps, horn; £56.—Smith, Baker, Wateringbury. [7206

1915 Big 4h.p. Norton, new November, 1915, 3 speed countershaft gear, splendid condition throughout; any expert examination, or reasonable demonstration; sacrifice for quick sale at 55 gns.—H. M. Charles, Chessington, Stoke Green, Coventry. [X4667

N.S.U.

N.S.U., £9/10, mag., B. and B., Brampton variable pulley, head and tail lamps, 3h.p.—Watson, Greenways, Hook. [7198

N.U.T.

N.U.T., 2¾h.p. twin J.A.P., 3-speed gear, tyres good; £25.—Morrison, John St., Langholm. [7264

O K.

O.K.'s in stock, M.A.G. £42/10, J.A.P. £38.—Youngs, 2 and 3, The Parade, High Rd., Kilburn. [6931

O.K., 1916, 4-stroke, 2-speed, countershaft, elaborate accessories, spares, and tools, as new; £25.—Heed, 31, Hainthorpe Rd., West Norwood. [0867

Omega.

1916½ Omega, 3h.p., 2-speed, 2-stroke, done 500 miles, will take sidecar, spare petrol tank, vaporiser, excellent condition; take £33.—A. Maddock, Springfields, Alsager, Cheshire. [7156

P. and M.

P. and M., 3½h.p., 2 speeds, in good order; a bargain, £15.—Percy and Co., 337, Euston Rd., London. [7421

P. and M., 1909, 3½h.p., 2-speed, new sidecar body, aluminium footboards, spare tank; £19/10.—J. Bowen, 29, Jersey Terrace, St. Thomas, Swansea. [7160

P. and M. Combination, 1914, 3½h.p., and P. and M. sidecar, lamp and horn; £55; deferred terms if desired.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [7223

Peugeot.

3½h.p. 1913 Pengeot, Bosch, B. and B., good tyres, belt, lamps; £20.—61, Peckham Park Rd., S.E. [7143

Precision.

PRECISION Engine, 2¾h.p., Sturmey-Archer 3-speed gear, free engine, clutch; £28.—M. Shanks, Downham, Norfolk. [X4499

2¾h.p. Torpedo Precision, B. and B., adjustable, Bosch, done 3,000 miles, 160 m.p.g., splendid condition; £19.—Rhodes, 8, Ash Grove, Weaste, Manchester. [X4690

Premier.

PREMIER, 1915, 3½h.p., 3 speeds, countershaft, kick starter, coachbuilt sidecar; £44; in nice order.

PREMIER, 1913, 3½h.p., 3 speeds, coachbuilt sidecar, perfect order; £29.—Percy and Co., 337, Euston Rd., London. [7410

1914 4h.p. 3-speed Premier, in perfect running order; £25, lowest.—Chapmans', Engineers, Hurlingham, S.W. [7200

1913 Premier, 3½h.p., Philipson pulley, sound condition; £20.—Montgomery, Victoria Rooms, Bristol. [X4257

PREMIER, 1914, 2¾h.p., excellent condition, Gradogear; £21, bargain.—Wheldon, 251, Barking Rd., East Ham. [7269

1914 3½h.p. Premier, 2 speeds, coachbuilt sidecar; £45; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0823

1914 Premier, 2½h.p., 3-speed, clutch, all accessories; £24.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [7397

1914 3½h.p. Premier, 2-speed, handle start, Bosch mag., head and tail lamps, new tyres, splendid order; £33.—A. H. Ellis, Wivenhoe, Essex. [7381

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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Preferential Treatment for Front Cylinders.

IN another part of this issue we describe an arrangement which has for its object the equalising of the explosions in either cylinder of a V twin, the idea of the designer being that, owing to the inertia of the gases, they would be left behind in the induction pipe and consequently fed more freely to the rear cylinder. That this action would take place to some slight extent at the moment of acceleration is, of course, quite obvious, but in the paragraph referred to we give reasons why this action should not continue when the machine settles down to a steady pace. It has been stated that the petrol in a cylindrical tank placed transversely will bank up at the back to some extent and remain in this position so long as the car retains its speed, as shown by the level of the petrol in the gauge. We cannot agree, however, that the two cases are analogous, for there is no disturbing influence in the tank to cause the petrol quickly to resume its natural position, but in the induction pipe the gases are flowing rapidly first in one direction and then in the other, leaving the carburetter in every case at a velocity equal to that of the motor cycle.

Every railway traveller knows that when the engine starts his back is pressed against the cushions for a moment as the train gains speed, if he is sitting with his face to the engine, but that this sensation is not continued; moreover, when a piece of paper is thrown across a railway carriage it is not left behind so long as it is in the carriage, but as soon as it passes through the window and meets the outer air its speed, equalling that of the train, is at once arrested by the air resistance, and it is left behind. All motion is, in fact, relative. The contention of a natural surging of gas to the rear cylinder is not without interest, however, but if it could be substantiated the action would surely have been countered ere this in car engine design, where induction pipes are naturally much longer.

Future Petrol Allowances.

WE have already hinted that when the present petrol licences expire in April the allowances to motor cyclists may be reduced. No details as to the plans of the Petrol Control Committee have yet been disclosed, except that it has been definitely stated that the monthly grants will not be increased. When the Petrol Control Committee first began to get to work in August last, motor cyclists were allowed the merest pittance of petrol. When winter arrived and the new licences came into force a more reasonable allowance was made, and motor cycling, that most healthful and beneficial of pastimes, could be carried on, as it should be carried on in war time, in moderation. It has been hinted that at the present moment there is petrol enough and to spare after the needs of the Services have been supplied, but that the proposed restrictions are intended to force economy on motorists so that they may have more money to lend to the country. Looking at it from the motor cyclist's point of view, it is difficult to see how much more they would be forced to save by having their petrol allowance reduced, or even stopped altogether. The money actually paid for petrol would be saved, it is true, but the 1s. tax levied on every gallon would be lost, and the amount left for motor cyclists to put into the War Loan would be infinitesimal.

It has always seemed to us that the control of the sale of petrol, so long as there is plenty for everybody, has been grossly unfair. No distinction is made between the man who uses his machine for business and the man who rides for health and pleasure only. The doctor and veterinary surgeon are rightly given all they require, but the road surveyor, the commercial traveller, the clergyman, and the journalist get no consideration whatever.

We all want to finish the war off quickly; will it be prolonged if we use petrol? We venture to think not.

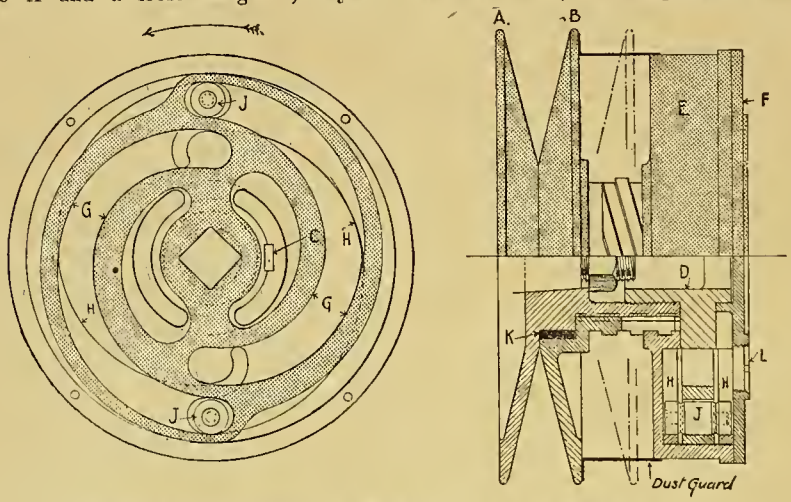
An index to the advertisements in this issue will be found on the page facing the back cover.

AN AUTOMATIC GOVERNOR PULLEY.

A Device which alters the Gear Ratio in Proportion to the Power and Resistance.

AN ingenious automatic pulley has been invented and patented by Mr. H. L. Brooke, of Bradford. It can be made in three forms, that which we describe is preferred by the inventor; the other two are partly controlled by springs, but the principle is in the main identical.

The V belt pulley consists of a fixed flange A and a loose flange B, keyed together by a feather key C, which permits the loose flange to slide. To the boss of the fixed flange is attached a part D, and on the boss of the loose flange is a suitable thread, engaging a thread on the boss of the governor pulley E, which has a cover F. Part D has grooves G, and the inner faces of governor E and cover F have curves H, which are duplicates of each other and of the outer faces of grooves G. Pins J pass through the grooves G, and engage curves H, and are designed to have rolling contact with the said grooves and curves.



Brooke's governor pulley, the details of which are described in the accompanying article.

Correct design depends upon the shape of the outer faces of grooves G and of the curves H. Differential rotary motions of the governor pulley E, relative to the V belt pulley, will cause the loose flange B to move to or away from the fixed flange A, according to the direction of the differential motions. It may be noted that, as drawn, one complete differential revolution of the governor pulley E is possible. The force tending to move the belt pulley to the top gear position, as drawn, is the centrifugal force generated in pins J, which causes them to roll along grooves G and take the pulley E with them. The force tending to move the belt pulley to the low gear position (loose flange shown by chain lines) is the impulses of the engine acting against the inertia of the governor pulley E.

It must be noted that the *normal position* of the belt pulley is top gear position, as drawn.

The balancing of the two opposing forces that control the governor pulley E, it is claimed, constitutes a true governing action, all increases of power not giving equivalent increase of speed, as when climbing, causing a correct reduction of gear ratio and *vice versa*.

It is proposed to design the pulley so that normal position of top gear be obtained under normal conditions at an engine speed of about 700 r.p.m. It may be accepted that normal conditions mean running on the level.

Claims.

We have not tried the pulley, but flexibility is claimed under all conditions. The grip on the belt is ensured by the constant tendency to move towards top gear. Low gear at low speeds, for starting, or whenever needed, is automatically obtained, because the small centrifugal force in the pins at low speeds would not resist the light impulses of the engine.

The full power of the engine is obtainable without reduction of gear if there is equivalent increase of speed.

Screws L are shown to enable different sizes of pins to be inserted. Simply changing the size, and *therefore the weight*, of the pins would be equivalent to a complete change of average gear ratio between the engine and tractor wheels. The smaller the pins the higher the engine speed relative to machine speed. Thus, if a certain size of pin made a machine suitable for solo work, a smaller size would make it suitable for sidecar work, by reducing the *average* speed of the machine relative to power and speed of the engine, thus preventing overstrain of the engine.

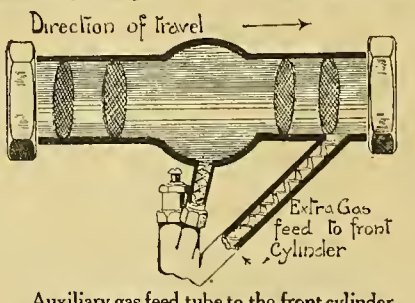
Finally, reduction of gear tends to permit increase of engine speed, which, in turn, would tend to return to top gear, there being a true governing action. *Top gear would be normal*, all other positions being the result of changes in the relationship of power and speed.

VALVE TIMING ON TWINS.

Should the Front Cylinder have Preferential Treatment?

IN our description of the new Harley-Davidson we mentioned that the valve timing was not the same in each cylinder. A variation in the timing is not by any means a new idea, and we remember that, years ago, Mr. Norton stated that better results could be obtained by some such modification. The same principle was used nearly two years ago in a petrol consumption trial in America, in which it is claimed that H. Cameron covered 91.2 miles on two quarts of petrol. His machine was a twin Indian, and he ran throughout on the pilot jet with gauzes in the induction pipe. This answered well at slow speeds, but when going fast the front cylinder ceased to fire. Cameron therefore fitted an extra pipe to give an easier path from the jet to the front cylinder, and this overcame the difficulty.

The explanation given is as follows: "The gas and air are heavy. When the motor cycle lurches ahead they quite naturally surge towards the rear, just as so much water would surge to the rear if it were in the manifold in place of the mixture."



Auxiliary gas feed tube to the front cylinder of a 7 h.p. twin. This arrangement facilitates even firing whilst running on the pilot jet.

Personally, we do not think the explanation is sound, nor that there would be any surging to the rear except when the machine was accelerating. At a constant speed the inertia of the gases would prevent the effect described, for, while the gases were passing up the pipe from the pilot jet, they would have a forward velocity equal to that of the machine, and this velocity would be maintained in the induction pipe unless they met with some outside resistance, which they could not do. As it is stated as a fact that the extra pipe improved the running, we should be inclined to attribute the result to a leak somewhere in the induction system of the front cylinder.

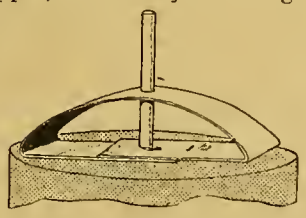
Occasional Comments by "Ixion"

The "Ben"—R.I.P.

MANY a motor cyclist felt a real pang when he read last week that the dear old *Ben-my-Chree* had been sunk by gunfire in the Mediterranean; indeed, the Admiralty intimation was the first some of us had heard that she was doing her bit as a seaplane carrier. For the benefit of the uninitiated, I should explain that the "Ben" was the greyhound of the Manx steamers, and robbed the T.T. of half its terrors for many of us. She could do the seventy miles from Liverpool to Douglas in just over three hours, and, as one enthusiast put it on a day when all the smaller boats were rolling and pitching, "She has a good front fork, and her rear springing's extra!" We still hope the submarine caught her in shallow water, and that she can be salved. Oh dear! Shall we all have to cross in the *Lenella* for the first post-war T.T.? We felt less regret when another of the Manx boats, the *Ramsey*, was sunk by gunfire in the North Sea; for it was a steep-sided narrow boat, with a nasty knack of rolling on the least provocation; and, thanks to her, many of our readers have paid for dinners which did not benefit them.

A Carburetter Detail.

I ILLUSTRATE herewith the ingenious detail by which the petrol level is maintained on some carburetters. It is really self-explanatory. The bent strip is made of copper, and has just enough spring to keep the two holes in the overlapping ends out of register, and so lock the clip on the float needle. If the two ends of the clip are pushed inwards with thumb and finger, the holes register and the clip slides up or down the needle easily. One of these clips came handily to my rescue the other day; the carburetter which I was using had a split pin above its float, and the pin had commenced to gape a bit with age and many removals, so that it would come clean off the needle whenever I ran the engine hard. With this clip I was able to get a firmer setting.



Float needle clip referred to in accompanying article.

Overhead Valve Engines and Tune.

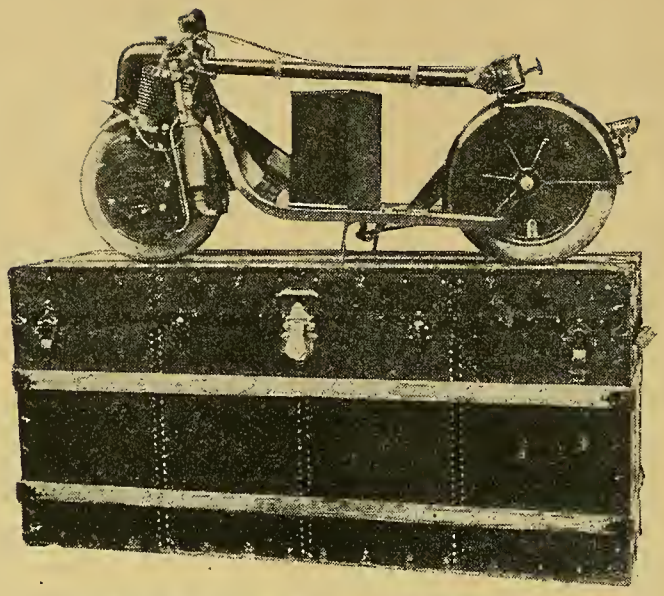
UNTIL the M.A.G. engine, with its enclosed overhead valve mechanism, came along, it was unquestionably true that overhead valve engines kept their tune badly. The cams and tappets of the side valve engines suffer from wear that is microscopic in character; the one exposed point is the clearance between valve stem and tappet, and on the average engine that point is automatically lubricated—I had almost said over-lubricated. On the o.h.v. engine there are four exposed points at which wear may be expected, the bottom of the long tappet, the top of ditto, the rocker pivot, and the rocker tip. The first of these is automatically lubricated, as stated; the other three are unlubricated on many engines. The tips of the rocker cannot be lubricated on many o.h.v. engines, and in some cases the pivot bearing cannot be kept oiled either. Wear at all these points piles up, until a fraction of wear at each point affects the valve timing quite considerably. On other engines the adjustments for this wear are flimsy, and it is not easy to set them with perfect accuracy; so that one is perpetually fiddling with tappet adjustments. The best method of furnishing a little makeshift lubrication at the points under criticism is to dab a spot of graphite grease between the wearing surfaces; it will not last indefinitely, but it retards wear, and it makes for silence.

The Franklin Piston.

LIKE most makers of air-cooled engines, the Franklin Co. are eager to avail themselves of the aluminium piston: first, because it keeps cooler than a steel or iron piston, and engine temperature is of such urgency with air-cooled engine; and, secondly, for the sake of an indirect gain—that the cooler a piston keeps, the less it carbonises. For the same pair of reasons, two-stroke designers are keenly experimenting with aluminium pistons. The Franklin engineers found that, if they gave the new pistons a safe clearance, they "slapped" and rattled; and that, if they reduced the clearance to the silence point, the pistons broke or seized. More oil on the cylinder walls seemed to be the solution, but they did not want more oil at any other point. So they carved a deep groove to wind spirally round the piston between the upper rings and the scraper ring; and this groove retained some surplus oil, and enabled the piston to work with a clearance which forbade any slap, and yet without seizing or smashing. I rather fancy that Mr. J. L. Norton was about the first British designer to utilise oil-retaining hollows on his pistons with a similar end in view. One or two other makers scollop the entire waist of their piston, but I never found that a vague, general recessing of the piston waist served as well as more definite oil-retaining grooves. I remember how, when these things were less understood than they are to-day, I used to file down the waist of my piston, and talk learnedly about piston distortion. I held forth to this effect one day in the presence of a noted engineer, and he said bluntly: "I don't believe in these distorted pistons and high spots; your filing does its work by providing an oil trap!" It is only fair to add that the more maniacal devotees of aluminium pistons deny that they require a lot of oil: and they say such troubles as the Franklin people describe only occur in works where the machining is not accurate to fine limits. Personally, I have owned five or six aluminium pistons: none of them were loose enough to "slap," as the Americans quaintly put it; and all of them wanted lashings of oil.

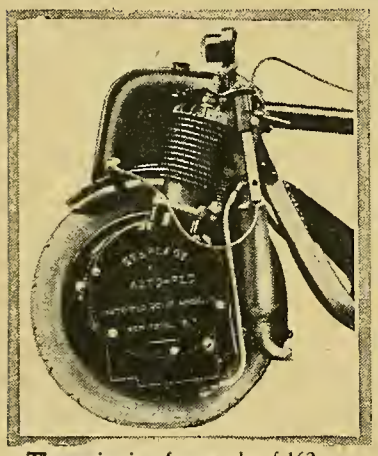
STANDING ROOM ONLY!

THE general tendency in this country is to more comfortable motor cycles and the adoption of spring frames in addition to spring saddles. Our cousins across "the Herring Pond" appear, however, to be made of sterner stuff, if we may judge from the last American importation. Just how it came to be imported we are at a loss to understand with the present ban on all things motorish. Did it come through as a commercial vehicle designed for the use of errand boys, or is the clue to the mystery to be found in one of our illustrations?



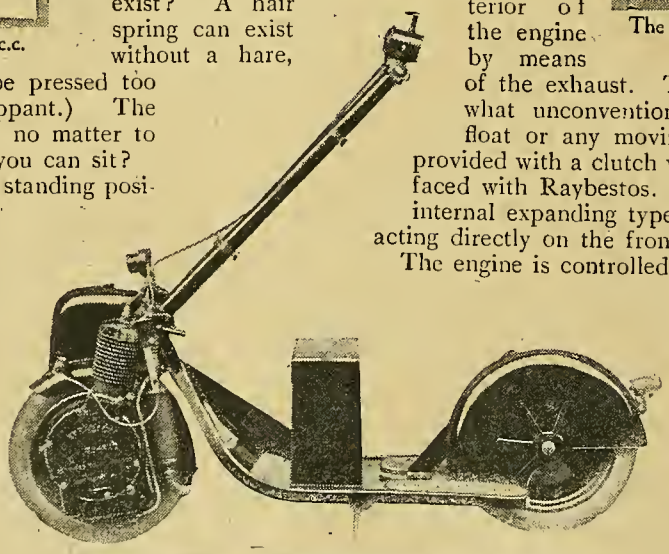
The Autoped and its packing case. Is it a portent of the future? Will the Auto trunk be a necessary part of the luggage when the seaside and promenade are thought of again?

A careful examination failed to reveal any spring frame, and spring saddles appear to be as rare as spring flowers. (By the way, can one spring what does not exist? A hair spring can exist without a hare, but the analogy must not be pressed too far. We must not be flippant.) The absence of a saddle may be no matter to some, but why stand when you can sit?



The engine is a four-stroke of 162 c.c.

On the other hand, in the standing position, we believe that eights and loop threes can be executed with ease and precision, while any skater knows that sitting down is fatal to the graceful performance of these simple figures. It seems a pity that no reverse is provided, for this makes it quite impossible to perform a rocking turn, which necessitates a change of direction but not a change of edge. This would be a most effective figure if done at high speed on a falling gradient, provided that nothing else was failing.

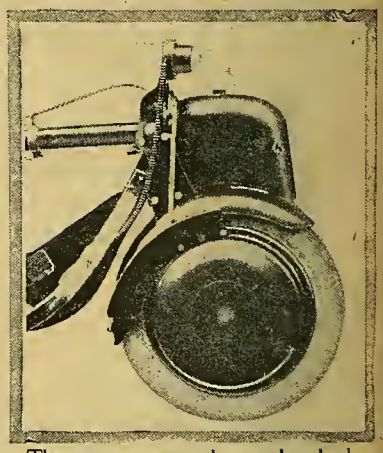


The 2 h.p. "Eveready" Autoped mechanical scooter in racing trim.

THE AUTOPED, AN AMERICAN MOTOR SCOOTER.

Engine Details.

The engine is a single-cylinder four-stroke, 2¼in. bore × 2½in. stroke (162 c.c.). The piston has two rings, the gudgeon pin is of nickel steel, heat treated and ground, running on two hardened bronze bushes pressed into the piston. The connecting rod is a drop forging and fitted with a hardened bronze bush at the crank pin end. The crankshaft is a solid drop forging with the web, counter weight and crank pin forged integrally. It is hardened, ground, and runs on a bronze bush at one end and on a ball bearing at the flywheel side. The engine is lubricated by spraying the oil from the sump into the interior of the engine by means of the exhaust. The carburetter is of somewhat unconventional design, and is without float or any moving parts. The Autoped is provided with a clutch which is of the dry disc type faced with Raybestos. One brake is fitted of the internal expanding type faced with Raybestos, and acting directly on the front rim.



The tea cosy receptacle over the wheel is the petrol tank.

The engine is controlled by one twist handle on the right-hand side of the handle-bar, which raises the exhaust and opens the throttle. The magneto, which is housed completely in the flywheel, is entirely concealed, the only visible part of the ignition system being the cable leading from the inside of the flywheel to the sparking

Standing Room Only!—

plug. The petrol tank is of pressed steel, all joints being welded, and is attached to the front mudguard, while the steering column also acts as an auxiliary tank. This column is capable of being pulled down into a horizontal position and clipped to the rear mudguard, so that it may be stored out of the way, and also used as a handle when it is desired to carry the machine about.

The machine, of course, will be regarded as a motor car or motor cycle within the meaning of the Motor Car Act, and must therefore be registered and carry number-plates, and the owner must take out the usual licences. It also cannot be used until it is fitted with two independent brakes; so far, it is only fitted with one. To mount the Autoped one has to run behind till the engine fires and then step on to the platform.

The Autoped has met with a certain amount of popularity in America, but is practically unknown over here. It is said to be quite suitable for short distances on good roads. The maximum speed obtainable is claimed to be twenty-five miles an hour, but an average speed of fifteen miles an hour is recommended. When not in use it can be packed in a trunk, and may be taken, at any rate in America, as passenger's luggage. The British agents are Messrs. George Newman and Co., 307, Euston Road, N.W., but supplies are not available owing to the ban of motor imports. The few specimens which reached this country were impounded by the authorities at Liverpool.

PORT DESIGNS ON TWO-STROKE ENGINES.

More Complete Scavenging by Increasing the Size of the Exhaust Port and Manifold.

SINCE it is the opinion of many experts that the two-stroke engine is the engine of the future, perhaps a short *résumé* of the principal advantages and disadvantages of this type of engine will not be out of place.

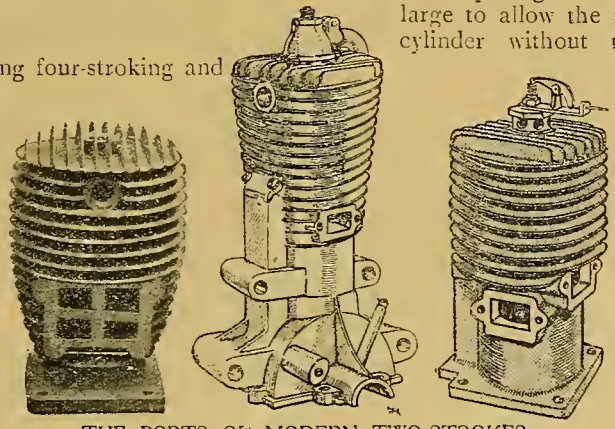
The chief merits of two-stroke engines are:

1. Excellent torque.
2. Good thermal efficiency.
3. Power for weight.
4. Simplicity.
5. Absence of valves.

The principal disadvantages are:

1. Want of flexibility.
2. Difficulty of cooling.
3. Poor scavenging, causing four-stroking and overheating.
4. High petrol consumption.
5. The difficulty of keeping crank case compression efficient.
6. Rapid carbonisation of piston rings.

The list of disadvantages may seem a trifle weighty to one who has had little or no experience of the remarkable practical efficiency of two-strokes. But on many types almost every one of these difficulties has been overcome by patient experimenting and ingenious design. Every day progress is being made by firms who, ignoring the whims of the public, are working to make the two-stroke engine a genuine and permanent success.

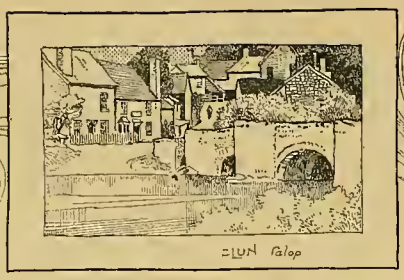


THE PORTS OF MODERN TWO-STROKES.
(1) Connaught two-stroke cylinder, showing combined inlet (at top) and exhaust ports (at bottom)
(2) Allon two-stroke, showing inlet and transfer ports.
(3) The inlet and exhaust ports on the Radco two-stroke.

Two-stroke Defects.

It is to such as these that I would point out the following defect—a defect known and recognised by all manufacturers and users of two-stroke engines from the days of the old two-stroke four-wheelers to the present day, when the two-stroke holds a fair share of the market and might hold more. There being no proper scavenging stroke on these engines, the efficiency of the exhaust depends almost entirely on the area of the exhaust outlet. The design of deflectors on piston heads means much when considering such a question, but the amount of outlet available for the exhaust gases means much more. On many machines I have observed that the exhaust port area was seemingly designed to equal that of the inlet. On many two-strokes a similar resemblance was apparent between the areas of the transfer and exhaust ports. This is *prima facie* absurd, since the new mixture is mechanically forced into the combustion head, and therefore a passage from the crank case sufficiently large to allow the new mixture to flow into the cylinder without undue difficulty would not necessarily be sufficient to pass out hot and expanded exhaust gases under far greater pressure. Larger exhaust ports would in no way interfere with the timing, since the increased dimension would be made horizontally. Difficulties of construction might occur if very much increase were made with some types, but on many of the machines I have examined in this respect quite twice the existing outlet area might be utilised with no other change than an increase in the size of the exhaust manifold. Expense might, of course, keep many firms to their present arrangement, but I think most of the motor cycling public have sufficient confidence in the British motor cycle manufacturers to believe that progress is their policy and perfection their end, even though many considerations must of necessity control their policy and end. The one way for two-stroke makers to show that they mean to demonstrate the permanency of two-stroke popularity is to make their power units equal to four-stroke units in all ways, and superior in those ways which the natural advantages of two-stroke engines bring forth.

PROGRESSIVE.



The Hygiene of Motor Cycling.

A Few Valuable Hints by a Medical Motor Cyclist.

UNDER suitable conditions few sports or pastimes are more conducive to health and vigour, both of mind and body, and at almost any age, than is motor cycling. There are, however, certain risks which riders would do well to bear in mind, especially those of us who have already passed our twenties. I am not referring to accidents, but rather to cases where a lack of knowledge or discretion may lead to what are usually, but not necessarily, minor disabilities and discomforts. Most of the hints I venture to put down here have been suggested to me either by personal experience as a motor cyclist or by the complaints of motor cycling patients and friends.

I know a rider who recently ran short of petrol about two miles from home. Very wisely he left the machine and sidecar in a garden near by and finished his journey on foot, returning at his leisure with petrol in the evening. An acquaintance to whom he related his experience asked him why he did not push the cycle back and so save two unnecessary journeys and a good deal of time. The question was a foolish one, even though some men might have made the attempt, possibly in a few cases with impunity. The incident brings home the fact, however, that any but a lightweight solo mount is too heavy to be pushed for more than a few yards by hand. It is of the utmost importance to remember this. It is as easy to do irreparable injury to that very delicate piece of mechanism the heart when it begins to "knock" as it is to ruin an engine under similar circumstances. When anybody, at any rate anybody over thirty, feels his heart beating rapidly and forcibly after exertion let him take thought and rest. Just as there is a temperature above which an engine may not be heated without permanent damage, so there is a point beyond which the valves and muscles of the heart may not be strained without the same result. To renew an engine is easy, to renew a heart is impossible, and even to repair it may be difficult. Precisely the same considerations apply in connection with the exertion of dealing with an engine which refuses to start up quickly. When your heart begins "knocking" take a rest, and employ the time in calm reflection. Perchance it may occur to you that the petrol tap has not been turned on, or that the terminal at the plug has become disconnected. But, whatever happens in this respect, the risk of personal damage will have been avoided. One does not wish to drive this advice beyond the limits of commonsense, but the point I have raised really needs emphasising with many people. Bearing it in mind may just prevent an excursion into the region of tragedy.

The writer of the accompanying article, who is a medical officer on the Somme.

The Value of Goggles.

How and when to use goggles is another thing well worth considering. A few there be apparently who neither desire, nor feel the lack of, these most comforting appliances, but most of us are less fortunate. Motor cycling may be trying to the eyes in three ways. First, there is the effect of the wind (and of insects or small foreign bodies which may be borne along with it) on the delicate conjunctiva—the stronger the wind the greater the ill-effect. Secondly, there is the strain of keeping the attention fixed, partly on the road ahead and partly on the surrounding objects—the worse the road the greater the strain. Any astigmatism or other abnormality of the lens, of course, is an additional harmful factor. Finally, in sunny or fine weather there is the glare or intensity of reflected light. How severe and painful this may be is best realised by those who have been in such regions as the higher altitudes of Switzerland, where the combination of bright sunlight and perpetual snow obtains. But in summer, glare is by no means to be ignored even in England. Any or all of these causes may have two results. On the one hand, they may lead to aching of the eyes and redness and inflammation of the thin membrane covering their surface. On the other, the headache, which is not infrequent after long and trying rides, may often be ascribed in part to eye strain of one kind or another. As far as anything can do so, a pair of light, well-fitting goggles, tinted if necessary, will tend to minimise or even do away with these discomforts.

Engine Noises.

There is no doubt that some people find the noise of the engine very trying. In my experience, all machines powerful enough for sidecar work are noisy, though some are much worse than others, and even the same machine varies within fairly wide limits. One does not wish to be considered a faddist. I

The Hygiene of Motor Cycling.—

must confess, however, I have found that a plug of cotton wool in each ear adds greatly to the enjoyment and diminishes the fatigue of a long ride, especially in very dry and windy weather. It is the sharp, high-pitched, crackling element of the explosion and the clatter of the valve gear which tend to get on one's nerves.

Weather Conditions.

Motor cycling is one of those sports the devotees of which are at times subject to severe exposure to bad weather. This may be of little moment to the more hardy, but it is not wise for the majority of us to treat the matter too lightly. Seeds sown in the course of a few hours' carelessness may have a harvest in the form of many weeks of discomfort. I have in my mind at the moment a man who set out from Birmingham for a ride which, under the circumstances, took about seven hours. It was raining when he started, and it came down in torrents of almost tropical intensity for the whole distance. In spite of macintoshes he was naturally drenched to the skin. There were no serious results in the form of a definite illness, but for weeks after he suffered from severe neuralgia and rheumatic pains. I know of no way by which he could have avoided this except by refusing to undertake the ride. I suggest, however, that in such cases discretion may be the better part of valour, and that it may be wiser to refrain from tempting Providence too much even at the cost of a certain amount of delay and inconvenience.

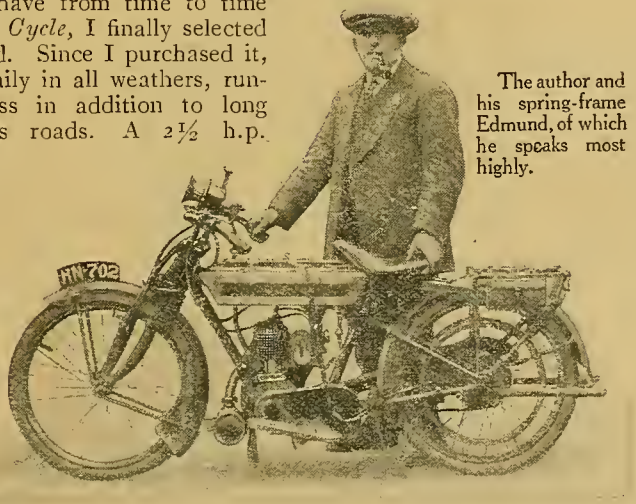
This is an extreme instance, but it is by no means uncommon to find that people whose teeth are bad, or who are subject to facial neuralgia, bring on an attack of the latter by riding insufficiently protected against too strong or too cold a wind. It is worth while taking a little trouble, perhaps even of risking a little ridicule, to provide adequate protection to the face. A simple, effective, easily procured, and by no means unsightly device, however, is a woollen helmet which fits closely over the head and neck, with just a space for eyes, nose, and mouth. With this there is no need for a hat and no fear of the head gear being blown away. It looks as comfortable as it feels, and costs only about a couple of shillings or half-a-crown.

One may admit, in conclusion, that motor cycling has certain risks and drawbacks. So has every other recreation. Yet not only are they of comparatively minor importance, but practically all of them may be overcome by the use of a little forethought and commonsense. No motorist who has once tasted of the joys of the open road would ever willingly give them up, even were the drawbacks much more serious than they are. But it is surely wise to minimise even slight disadvantages where this is both possible and easy. That these few simple hints may help someone to do this is my excuse for having set them down.

SPRING FRAME EXPERIENCE.

A Reader's Experiences with the Edmund Spring-frame Lightweight.

IN view of the enormous interest the springing of motor cycles has created, and the importance the question has undoubtedly assumed, it may be of benefit to potential purchasers of motor cycles to hear of the experience of one who appreciates comfort when riding. Having studied the various and numerous types of spring frames that have from time to time been illustrated in *The Motor Cycle*, I finally selected as my solo mount the Edmund. Since I purchased it, the machine has been used daily in all weathers, running to and from my business in addition to long country rides over atrocious roads. A 2½ h.p. J.A.P. engine is fitted, together with Enfield two-speed gear and Druid Mark II. forks.



The author and his spring-frame Edmund, of which he speaks most highly.

At first I was doubtful if this machine would safely carry my weight (*i.e.*, 14 stone), as it seemed so springy, but the very first ride dissipated all doubts. In a few minutes I adjusted the springs to suit my weight, and tackled some pot-holey roads. The result was a revelation to me: the spring frame never "bottomed," and there was no rebound. The sensation is simply one of floating. I might remark that the footboards are sprung in conjunction with the saddle, a refinement most acceptable.

As the frame construction does not allow of any lateral saddle play, the tyres cling like limpets to a greasy road, which engenders considerable extra confidence in a timid rider; in fact, any rider.

The back mudguard would be better fitted with a valance, on the lines of the Enfield, and the back brake should, in my opinion, be controlled through a Bowden cable to the footboard. My motoring experiences have extended uninterruptedly over about fifteen years, and as a private owner I have had several cars and more than a score of motor cycles of various types, including about ten sidecars, but have never previously written my experiences of any machine. In the present case I could not resist, as I desire others to realise the great difference between sprung and unsprung motor cycle frames. I am fortunate in having two new machines each season, a solo mount and a combination; the 2½ h.p. Edmund and the 6 h.p. Enfield are my present mounts, and both are entirely satisfactory.

PERCY ROBERTS.

MILITARY NOTES.

"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS "TANKS."

AN OLD WAIL.

IN sending us from France the photograph reproduced on this page of D.R.'s of the A.S.C., M.T., one of the trio says :

"The print portrays three motor cyclists in our scena, 'Don't motor for pleasure—We don't!' Our earnest hope is that your influence will prevent motor cycles being sent out with ½in. wheel-mudguard clearance, footrests in front of the crank case, and similar absurdities."

"Don't motor for pleasure—we don't!" say the above trio in France.

MUD SUCH AS ENGLAND NEVER SEES.

IN an interesting communication Second Air Mechanic H. W. Mason, who is attached to the 18th K.B.S. of the Royal Flying Corps, reiterates the old complaint of inefficient mudguarding. He says : "I thought motor cycling was bad enough last year, but on present surfaces it is fiendish. I was out one night recently, and had to empty the mudguards three times in about two hundred yards, taking the front wheel out each time to get the mud out properly. Another time I had to leave the front mudguard on the road, as it was hopeless trying to move with it on. I was just about fed up, so I reported it to the transport officer, who agreed that I could improvise a canvas shield for the front, and utilise part of a petrol can for the rear guard, as will be seen by the photograph. I have found with my experience that the secret of strenuous riding is bracing yourself up with a belt as tightly as possible. Before using one I experienced great discomfort in long distance riding on bad roads, but now I feel no ill-effects, whatever the state of the road."

THE "TANKS" ON THE SCREEN.

WHEN the "Tanks" first appeared on the screen last week they were greeted with the greatest enthusiasm. Long ago they seized the popular imagination. Photographs of them have appeared, but the general public have but little idea of the surroundings and methods of this type of attack. The *Times* said: "The only criticism to be heard of the pictures was that there was not more of the Tanks. One saw them preparing for the fray, lumbering into action with a majestic roll, and emerging from the ordeal of battle followed by crowds of cheering soldiers. The man who at the Scala expressed his disappointment that he had not seen a Tank climb a tree only voiced in exaggerated form the wish of many to see still more of these uncanny monsters."

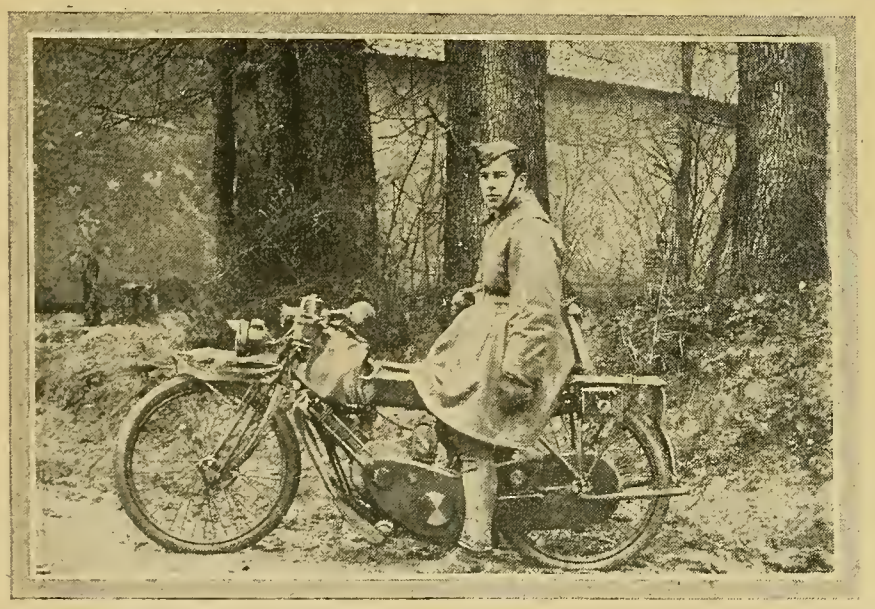
MENTIONED IN DESPATCHES.

AMONG the officers mentioned by Field Marshal Sir Douglas Haig in his latest despatch appears the name of Lt.-Col. J. J. Shannessy, the managing director of the Midland Rubber Co., of Birmingham, who is at the present time home on sick leave.

ARMOURED CARS IN GERMAN EAST.

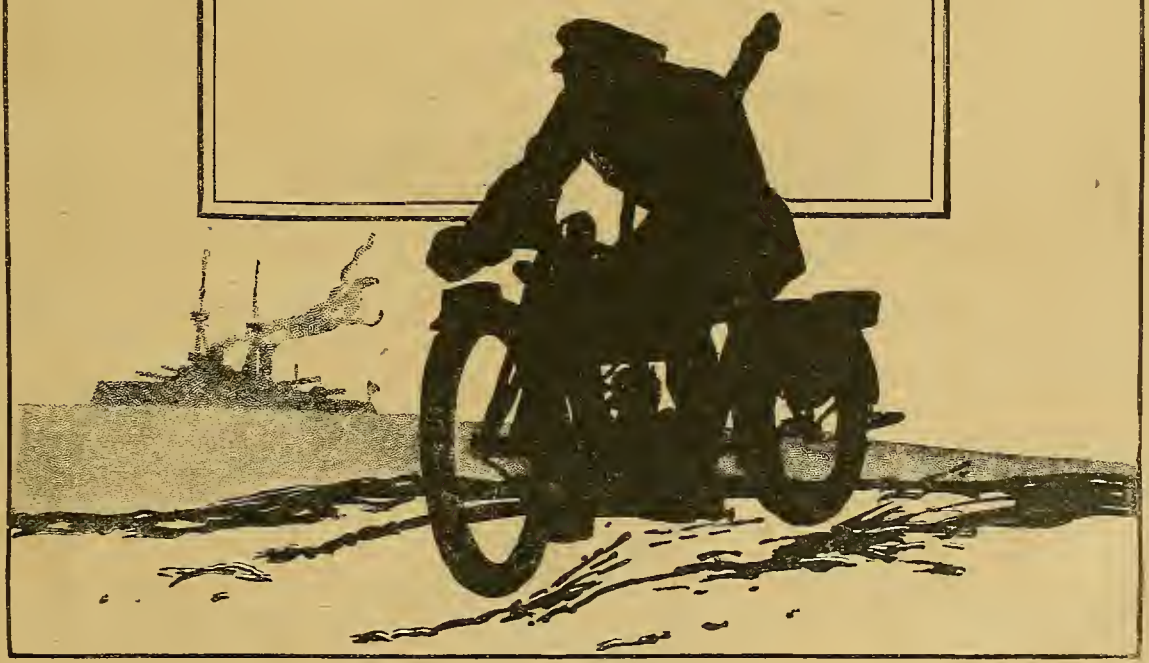
AT different times we have referred to the exploits of the armoured motor cars in German East Africa. These cars are attached to light armoured motor batteries, the *personnel* of which was recruited by the Editor of this journal. A picture of a complete battery occupied the double centre page of our issue of February 24th last. Attached to the cars are over a score of motor cyclist mounted infantry, who act as scouts. A number of well-known motor cyclists are acting in conjunction with these batteries in G.E.A., among them being Sergt. Southcomb May, Dvr. W. Miles-Thomas, and Sergt. H. S. Bilbe. (The last named, we are glad to hear, is rapidly recovering from a severe attack of dysentery.) This is what Reuter says of the latest action of one of these batteries :

"Light armoured motors came to close quarters with the enemy on January 3rd. Their armour was plastered with bullets, the machines coming under a heavy Maxim fire. They did great execution, but were eventually forced to retire owing to a wrecked radiator and boiling tanks. They had, however, silenced the enemy's fire, and sustained no casualties among their crews."

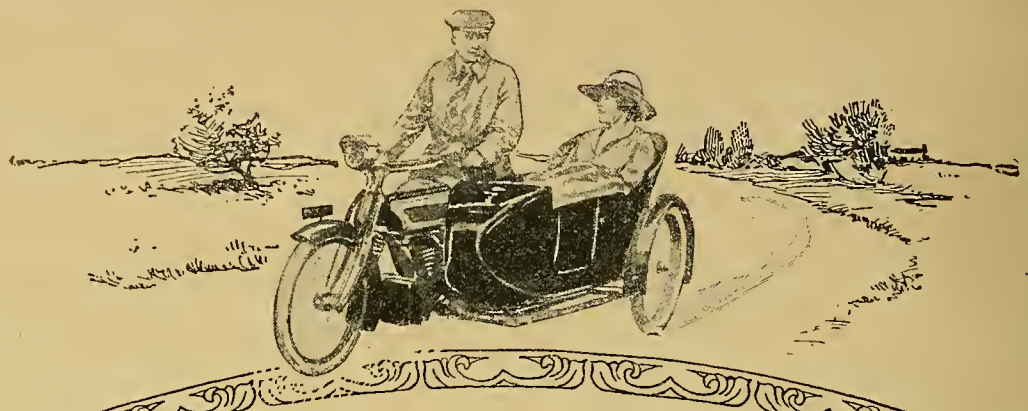


Makeshift mudshields improvised by 2nd A.M. H. W. Mason, R.F.C The rear guard is made from part of a petrol tin. (See paragraph.)

Thousands of
TRUSTY
TRIUMPH
MOTOR CYCLES
are in use on all Fronts.
TRIUMPH CYCLE Co., Ltd.
COVENTRY



In answering this advertisement it is desirable to mention "The Motor Cycle."



They are British-made

IT is against the National interest to purchase imported Tyres in War time. All the money is needed in the Country.

Wood-Milne Tyres are not to be beaten for Price or Quality. The Winter is coming on, and you want a really reliable Non-skid. We have it.

Wood-Milnes give better service, and cost less per mile, and are made in sizes suitable for every type of machine.

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TRADE MARK WOOD-MILNE

Bearing Pressures and Length of Stroke.*

The Original Writer's Rejoinder to Mr. J. L. Norton.

IN answering Mr. Norton's article in *The Motor Cycle* of January 11th I will use *actual* figures of the *actual* engines under discussion, for such an article cannot be answered in mere words. Firstly, I will confine myself to pointing out some of the more obvious errors. Mr. Norton says :

1. "Piston weight increases more rapidly than in direct proportion to an increase in size." This is surely wrong, because the area of a circle increases as the *square* of the radius, and its diameter increases directly as the radius. In two pistons, one of, say, 2in. diameter, the other of 4in. diameter, the latter would be four times the area, but would roughly have only twice the amount of metal in it. In the case of an 88 and an 82 mm. piston the difference is very small. Mr. Norton's first statement, then, is quite wrong.

2. "There being nothing to prevent both engines being balanced to the same degree of accuracy." In this I beg to differ. Mr. Norton has forgotten that the inertia stresses are greater in a long-stroke engine, owing to the length of its stroke, and are greater during the first half of the stroke.

Explosion Pressures.

3. I still adhere to my original statement of bearing sizes. The actual fact that, in spite of taking a piece out of the flywheel rim, the bearing of the Norton engine is *still much smaller* than the other, remains to *prove* my statement. I have shown, in my letter of December 7th, that the pressure on the big end bearing (neglecting inertia pressures) is 268 lb. per square inch, and that means practically 30% *greater* on the long-stroke than on the other engine.

4. Gudgeon pin bearing pressure on the explosion stroke (counting explosion pressures only) is 140 lb. per square inch, *i.e.*, 6.5% greater on the short stroke. Compare this with 30% greater on the long-stroke crank pin, and Mr. Norton's statement with regard to rebushing the gudgeon pin of the short stroke, owing to greater pressure, etc. I have yet to add inertia pressures, which practically equalise matters.

5. In quoting Mr. Norton with regard to putting a recess in the flywheel rim being a "slight advantage to balancing," I presume Mr. Norton means he can have a slightly lighter balance weight, otherwise the recess is a detriment to balance.

6. If in his instructive little drawings, Nos. 2 and 3, Mr. Norton had shown the piston in its proper place, viz., on the flywheel centre line, and noted the angularity of the rod in both cases, I think the drawings would have been even more useful than at present. I will, however, give the actual load on these bearings later.

Lubrication.

7. To give Mr. Norton his due, his lubrication ideas are really much in advance of anything I have previously seen. To suggest, in the engines under consideration, that, because the big end of the shorter stroke engine revolves in a radius $\frac{7}{16}$in. less than the long stroke, the latter is in the best possible position for lubrication, can only be characterised as prejudice. I venture to think few people will be misled by it.

8. Mr. Norton states that there is a return "for piston pressure due to the increased angularity of the long-stroke connecting rod." Why, if this effort is returned, does any engineer who knows his business specify as long a connecting rod as he can obtain for his engine? It is perfectly clear, as the rod becomes shorter and shorter, the less power is exerted on the crank pin and the more is wasted in pressure on the cylinder walls. The actual pressures are touched upon later.

9. Mr. Norton is very brief on the subject of centrifugal pressures. He wants to claim two conflicting advantages for the long stroke. He wants it run at a lower speed of revolution, and yet to keep its advantage of pulling at very low speeds. This cannot be done, as it means, in the first case, a higher gear; or, in the second, the same gear as the shorter stroke engine. The revolutions at which I proposed running our engines were 1,500 r.p.m., corresponding to a road speed of around 21 m.p.h. This is an average speed, and, it is safe to say, as often exceeded as not. Therefore, as in running the two machines I considered I used practically the same gear ratios, I am still going to adhere to this speed. The standard 4 h.p. Norton is not supplied, when sold, with a higher gear than is the other and smaller engine, therefore I am justified in my rating.

Multi-cylinder Engines not under Discussion.

The concluding quotation from Mr. Lanchester is really a weakness. It makes one think that Mr. Norton is trying to apply the idea of a multi-cylinder engine, such as Mr. Lanchester referred to (and on which subject I may say there are different opinions), to the case of a single-cylinder engine, which, as Mr. Norton is apparently unaware, stands in a class by itself.

My calculations are appended, and all I have to say, now that Mr. Norton has forced the matter is : How does the long stroke engine compare with the medium stroke?

	Long Stroke.	Medium Stroke.
Revolutions per minute ..	1,500	1,500
Weight of reciprocating parts in lb.	1.5	1.625
Stroke in feet	.393	.314
Area of piston head	8.18 sq.in.	9.42 sq.in.
Explosion pressure (250 lb. sq. in.)	2,046 lb.	2,356 lb.
Force necessary to reverse piston at end of each stroke (neglecting angularity of connecting rod)	225 lb.	196 lb.
Increase of force due to angularity of connecting rod (top half of stroke)	65 lb.	45 lb.
Total force acting on bearings	2,336 lb.	2,597 lb.
Pressure per sq. in. on small end	2,312 lb.	2,425 lb.
Pressure per sq. in. on big end	1,946 lb.	1,426 lb.

As concerns, then, the above, the bearing pressure on the gudgeon pin bearing, which, we must remember, merely oscillates, is nearly 5% greater on the short-stroke engine, taking Mr. Norton's conditions. It has, however, to withstand this pressure through a distance of, roughly, 25% less than the long-stroke engine, so, we may assume, will have a fair margin of life over that of the long-stroke.

In the case of the big end the pressure is *35% less* on the medium-stroke engine. There is only one conclusion to be drawn from this.

Balancing a Single-cylinder.

As regards balance, the secondary unbalanced forces on the long-stroke engine are nearly 50% greater, as shown during the first part of a stroke of the piston. Taking the long-stroke engine force of 225 lb., the force will vary plus and minus 65 lb. at each half of the stroke. This force can only be balanced by another connecting rod, which would have to work in direct opposition, as in the flat twin engine. Mr. Norton will doubtless, then, realise what the balancing of a single-cylinder engine involves, and why I stated that the long-stroke engine can never equal the medium-stroke in balance. As far as comparing the pressure of the piston during the explosion stroke on the cylinder walls, the figures I give may be interesting, as they are correct. On the long-stroke engine, the actual pressure will be a matter of *637* lb. total pressure.

On the shorter-stroke engine this figure is *577* lb. In addition to this the *area* of the *long-stroke* piston is considerably *less* than the other. Also, as far as the consumption of power goes, this is occurring for a 25% greater distance than on the medium-stroke engine. A.A.S.

*We think it well to point out that "A.A.S." is not comparing engines of identical capacity.—ED.

TIMES TO LIGHT LAMPS.

GREENWICH TIME.

Jan	25	...	5.4	p.m.
,,	27	...	5.8	,,
,,	29	...	5.11	,,
,,	31	...	5.14	,,

"Motor Cycle" Index Ready.

Any reader desirous of the index to *The Motor Cycle* from July to December, 1916, may have a copy posted to him for threepence.

A Motor Cycle in a Raffle.

The Russian-American Relief Association recently organised a large bazaar in New York, and a good sum was raised by the raffling of a fully equipped Harley-Davidson motor cycle, presented to the Association by the H.D. Co.

British-made Indians?

In select company recently, Mr. W. H. Wells, London manager of the Hendee Manufacturing Co., made more than a hint that after the war a factory would be erected in this country for the manufacture of Indian motor cycles.

Good-bye, Bosch!

Over 165,000 magnetos have been made in Britain for war purposes, and to-day the war is being conducted on British-made magnetos. After the war there will be no further need to buy enemy or other foreign magnetos.

Recruits for the Tanks.

"The famous Tanks are very largely manned by motor cyclists, the section being chiefly recruited by the leading motor cycle journal in England," says our contemporary *Canadian Motor Cycle*. It is customary to surround the motor cyclist in the firing line with a certain amount of dashing glory, but now he is almost eclipsed by the gallant crews of the slow-moving, trench-crushing Tanks. Certainly the motor cyclists in the Tanks see more genuine fighting than the motor cyclists awheel.

Alphabetical Disorder.

In an article entitled "Flat Twins Popular across the Water," reproduced with illustrations lock, stock, and barrel from *The Motor Cycle*, an American contemporary, after stating that "we will now deal briefly with some of the more popular flat twins in alphabetical order," heads the *alphabetical* list with Indian, the A.B.C., Bradbury, Brough, etc., following after. This is evidently on the grounds that A(merica) heads the list, B(ritain) coming next; but there is obviously no hiding a candle under a bushel in America.

The Outlook.

Last week's news, summed up in a nutshell, was a possible reduction in the petrol allowance, and an increase in the cost of tyres.

Miniature Motor Cycles.

The power-driven skicycle, similar to the American Autoped, cannot claim to be original in design. The first machine of the type was the Max, exhibited at the Stanley Show in 1905. Many will recall this miniature, but few know that Messrs. Douglas Bros., Bristol, made it to the order of the patentees. It had a J.A.P. engine. Later the "Motor Frip" made its appearance. Mrs. Kent was responsible for the Motor Frip, which she intended for ladies' shopping expeditions. This machine had three wheels, and was propelled by a 1½ h.p. Moto-Rêve engine.

SPECIAL FEATURES:

THE HYGIENE OF MOTOR CYCLING.
BEARING PRESSURE AND LENGTH OF STROKE.
STANDING ROOM ONLY.

British Magnetos.

Magneto making, which till 1914 was almost non-existent in this country, has now been scheduled as a "key" industry.

Involuntary Use of Benzole.

A correspondent informs us that, petrol being asked for by a car owner at a large garage in a fashionable South Coast watering-place, benzole was poured into the tank from sealed petrol tins! Such an experience is not so much to be dreaded as the substitution of paraffin mixtures for petrol, nor is it so likely to occur.

G. W. Wilkins, of Sheffield, in the saddle of a 4 h.p. Norton, and his friend in the sidecar, A. Blake, will be recalled by Midlanders as well-known competition men. Wilkins rode a two-stroke Levis in the last Six Days' Trials, and won a bronze medal in the lightweight class.

Starting on Acetylene.

We have received a letter from an experienced chemist, too late for inclusion in this issue, warning motor cyclists against the use of acetylene in their engines. This, he says, is very dangerous, and those who escape accident while using it do so simply by good luck.

Shell Oil Production.

The Shell Transport and Trading Co. announces that the oil products owned and controlled by the associated companies amounted during the past year to 5,155,000 tons, against 4,367,384 tons in 1915 and 4,786,000 tons in 1914. The output would have been larger had it not been for the conditions prevailing in Mexico and the impossibility of obtaining steamers for shipments of oil from that country.

A Double-barrelled Event.

An extremely strenuous endurance test between San Francisco and Los Angeles started on December 14th appears to have been a double-barrelled event, some of the competitors starting from Los Angeles and the remainder from San Francisco. A distance of 870 miles was covered, and the following machines finished with perfect scores: Five Harley-Davidsons, three Indians, three Excelsiors, and two Hendersons. Many competitors succumbed to the great difficulties of the trial.

Lamp Makers Please Note!

On finding that the new Lighting Order distinctly specifies that the lamps of a sidecar outfit must show the extreme width of the vehicle, a reader, while gloomily contemplating the design of a front fork bracket by which the lamp could be mounted clear of the bars, decided to write the Home Office. Great was his relief on hearing from the Secretary of State to the effect that "the Order was deemed to be complied with if the lamp were attached to the front pillar in the ordinary way."

Mounted Police.

The Sydney motor cycle police are mounted chiefly on British-made machines, including Douglas, A.J.S., B.S.A., James, Speedwell, and Rover. "Some exciting dust-ups are being eagerly awaited," remarks the motor cycling journal of New Zealand.

M.C.C. Meeting.

The ordinary general meeting of the members of the Motor Cycling Club, Ltd., will be held at the Monico, Piccadilly Circus, London, W., on Wednesday next, the 31st inst., at 6.30 p.m., to receive the annual report and statement of accounts, and to transact the general business of the company.

War Loan Subscriptions.

The B.S.A. and Daimler Co. have subscribed £500,000 to the War Loan, £430,000 of which is new money. The Dunlop Rubber Co. have applied for a quarter of a million, and the stock now applied for by the Automobile Association brings their total investments up to £77,000.

Aeroplane Body for Runabouts.

The average motor cyclist is keenly interested in aviation, and sporting men who use sidecars and runabouts favour a streamline body in preference to any other. In our sister journal *The Light Car*, published yesterday (Wednesday), there is a striking illustration of a typical aeroplane fuselage mounted on a light car chassis. Suggestions accompany the illustration as to what would happen if the "joy stick" were pulled.

Motor Cycle Thief Busy.

We are advised by Gnr. C. E. Fowke, of the Heavy Section, Machine Gun Corps, stationed at a camp near Wareham, Dorset, that he has had his 1914 pattern 3½ h.p. Triumph stolen. This model has a three-speed hub gear, and Gnr. Fowke's machine had T.T. handlebars, whilst the bottom fin of the radiator between the valves was broken off.

The National War Funds.

At the week-end the principal war funds stood as follow:

The Prince of Wales's Fund (distributed £3,529,719)	£6,025,027	0	0
British Red Cross Fund	6,002,820	0	0
Tobacco Fund	124,096	0	0

Avoiding Tail Lamp Troubles.

A correspondent writes us that after months of trouble with a choked tail light burner he has discovered a trick which completely overcomes the difficulty. On putting the machine in at night he turns off the water and quickly pinches the tube under the head light. This causes the whole pressure of gas from the generator to blow through the tail lamp, which, after about fifteen seconds, is extinguished. The excessive pressure of gas thoroughly scavenges the small burner, though, of course, the hint only applies in cases when both lamps are fed from the same generator.

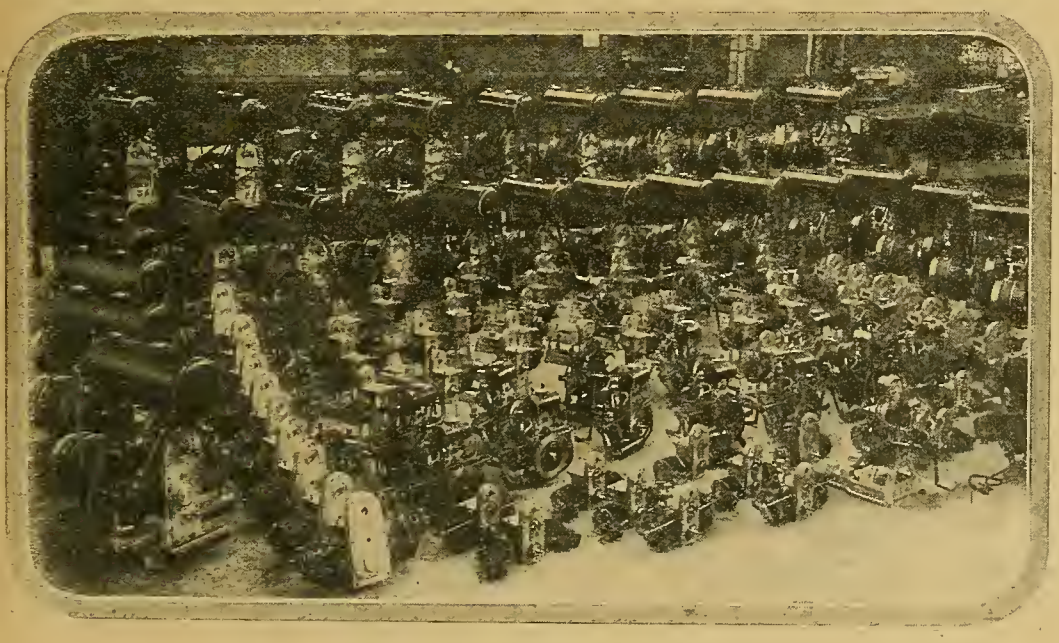
American Adoption of Term "Flat Twin."

Mr. John M. Taylor, of the Hendee Co., dislikes the term "flat twin" so much that he has gone to the trouble of denying its American origin in a letter issued to all the technical journals. "We have undoubtedly played a great many tricks with the English language," writes Mr. Taylor, "but we have not perpetrated 'flat twin.'"

No need for this denial, since *The Motor Cycle* takes full responsibility! But Mr. Taylor stoutly shoulders the even greater responsibility of speaking for the American nation by stating that the term would never find favour in the States! We note that the two leading American motor cycling journals and also the Canadian journal have already cottoned on to the term, which promises to become universal!

An Irish Opinion.

The *Irish Cyclist and Motor Cyclist*, referring to this term, says: "It is expressive, and, though America may not like it, it will stick."



FLAT TWINS FOR WAR PURPOSES

Because four firms supply practically the whole of the Government requirements in respect of motor cycles it must not be supposed that other motor cycle firms are not producing engines for war work. Our picture shows a batch of 120 A.B.C. flat twin engines nearing completion, all constructed to Government orders and intended for various power unit purposes. The engines range in capacity from 225 c.c. to quite large dimensions.

Necessary and Unnecessary Kit.

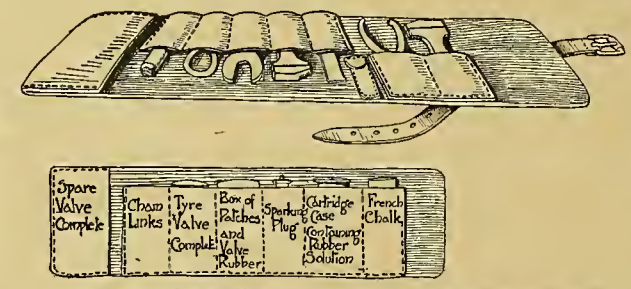
A FEW HINTS ON WHAT TO CARRY AND HOW TO CARRY IT.

MANY riders, on parting with an old machine, bundle into the kit bags a surprising assortment of cast-off kit, and the next man, telling himself that these belong to the machine, and should therefore remain where they are, conscientiously carries them about with him, much to the detriment of the kit roll and the saddle bags. On purchasing a second-hand machine, one's first act, after sounding the bearings, transmission, etc., should be to subject the kit roll to a searching examination. It is usually a simple matter to sort the tares from the grain, and the sundry tools with rounded corners and battered edges should be placed at the bottom of a deep hole in the back garden and carefully covered over.

A question one might seriously ask the novice, mounted on a second-hand machine, is—Are you carrying unnecessary kit? If so, drop it. Do not imagine it will ever be of use to you. It won't.

Necessary Kit.

With a new machine one or two set spanners are supplied, which should always be carried. In addition to the valve cap spanner, there are probably three smaller spanners belonging to the machine, and, as regards other tools, one's requirements are really quite modest. As Jerome put it, the question to be decided is, "What can we do without?"—not "What can we do with?"



A neat way of arranging the tool kit. A little method and care in this direction will save many shillings, and also much loss of temper.

The list of kit adequate for ordinary touring may be set down as follows:

Special keys belonging to machine.
Large shifting spanner.
Small ditto.
B.S.A. key.
Tyre levers.
Screwdriver.
Easy working pair of pliers.
Magneto spanner.
Belt punch or chain rivet extractor.

Spares.

As regards spares, there is no wisdom in stinting oneself. Carry always a spare tyre valve complete, and also a large-sized patch, so that, should the valve tear out of the tube, a complete repair can be made. If space permit, carry a tin of rubber solution rather than a tube. The following articles may be set down as the necessary contents of the spares bag, which occupies the opposite side of the carrier from the kit bag:

Tyre valve complete.
Patches, valve rubber, French chalk.
Rubber solution and emery cloth.
Tyre gaiter.
Engine valve complete.
Sparking plug (carefully padded).
Spare chain links or belt fastener.
Small assortment of nuts, bolts, and screws.
Roll of insulation tape.
Length of copper wire.

The Spare Tube—What to do with it.

A spare tube is, of course, advisable for serious touring, and may save trouble and discomfort at any time. To carry it without damage requires care.

Draw all the air out of the tube, then refix the valve and roll the tube neatly, wrapping it first in a damp, clean cloth, liberally sprinkled with French chalk, and secondly in a strip of American cloth, making the parcel as neat and firm as possible. The packet can then be fixed under the lamp bracket or in some other convenient position where it will be secure from oil. Do not carry the spare tube in one of the carrier bags or even in a special tube carrier, unless it is very carefully packed. I can suggest no better way of carrying the tube than that of making a special bundle of it, securely tied where it rides without excessive jolting. Naturally, the handle-bar is the best place.

A Home-made Tool Roll.

Spares and tools are really worth taking care of, and since their preservation is a matter of thought, rather than of trouble, the foregoing hints may be of some little value. The secret lies in carrying as little as wisdom permits, and in seeing that the few tools and spares one *does* carry are firmly packed in the panniers, and are not left to jolt holes in themselves and everything else with which they come in contact.

I have met the man who carries only a huge shifting spanner loosely in the pannier, and I suppose we are all familiar with the sportsman who opens his tool roll and stares in blank bewilderment at the array, having no notion what half the tools are for. Carry only necessities, and pack them well.

Necessary and Unnecessary Kit.—

As a rule it undoubtedly pays to buy the ready-made article rather than waste time and material by attempting to carry one's own brilliant notions into practice, but such an article as a leather kit roll can be very advantageously made at home. I still have in daily use a kit roll which I made five years ago, its long life being due to the secure manner in which it holds the tools, and to the good, tough material of which it is made, and I prefer the home-made tool roll to the bought article for the following reasons: (1.) By judicious arrangement the heavy tools one always carries can be made to lie flat in the roll, so that it straps up compactly and snugly (in a bought roll one has to place the big tools where they will go, rather than where they fit in best with one another). (2.) One can select a really tough leather and employ really strong stitching. (3.) The home-made article costs about one quarter of the bought article, and if properly packed in the pannier it lasts indefinitely.

How to Make the Roll.

Purchase a piece of tough, fairly stiff leather of the desired length and width, not stinting oneself as regards length, for even should it prove necessary to cut it down, a few bits of leather are always useful.

In addition to this stiff piece purchase a lighter piece (preferably thin pigskin) of the same length as the roll, and about 3in. in width. Now start off by turning inwards the end of the roll, so as to form a fairly deep pocket for the two or three small spanners belonging to the machine, as shown in sketch. Place the spanners in the pocket, then lay the remaining tools flat on the roll—the small ones at the pocket end, and the large ones at the opposite end—and roll up the strip, this being to find out the positions the tools should finally occupy for compactness and snug fitting. A surprising amount of kit can be rolled into very small space if properly arranged.

Having now found the best positions for the tools, the next thing is to arrange the pockets. The 3in. strip of thin leather is cut in half, and, with the tools still in place on the roll, the thin strip is loosely tacked in position over the tools—brass paper pins coming in very handy at this point.

The positions of the pockets now being fixed, the stitching can be left to the local cobbler, but it is more satisfactory to finish the job oneself, so obtain from the cobbler a few yards of wax end, taking care to stitch the corners and edges very strongly. This done, the kit is rolled and the strap fixed. Cheap straps are of no use for kit rolls. Buy a good pigskin strap, and it will comfortably last out the roll.

It is a good plan, while in the mood, to make a juvenile roll on the same lines for carrying spares and tyre repair outfit, this being kept in the second pannier, where only light stuff is stored. H.M.B.

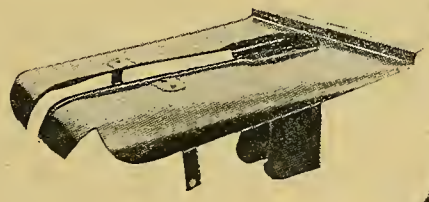
OFFICIAL RECOGNITION FOR MOTOR VOLUNTEERS.

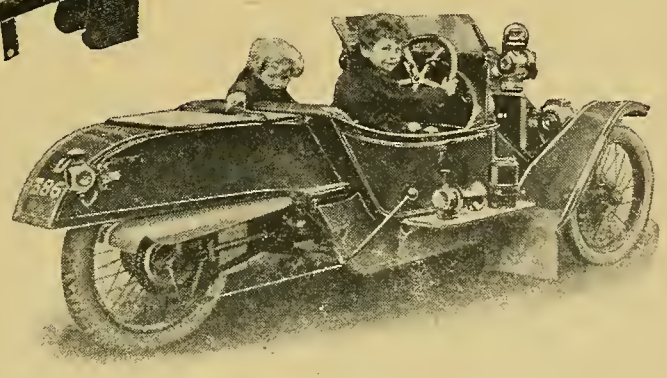
THE Motor Cycle has made it plain in recent articles that the question of the recognition of Motor Volunteers was only a matter of time. We are now in a position to state that the Government has decided to recognise existing motor organisations and organisations by counties, whether light or heavy squadrons. If and when the Field-Marshal commanding the Home Forces considers it necessary for training, petrol will be allowed. The primary duty of the Motor Volunteers is to provide the Volunteer Infantry with transport. A light squadron consists of fifty-six cars and twenty motor cycles. A heavy squadron twenty-four lorries, eight cars, and twelve motor cycles.

A TRANSMISSION GUARD.

A REFINEMENT WHICH SHOULD APPEAL TO MORGAN OWNERS.

A MUDGUARD specially adaptable to Morgan Runabouts, and which has been registered by Mr. Arthur A. Jaffa, 127, Vauxhall Road, Liverpool, is shown in the accompanying illustrations. It will be seen that the guard is fitted directly above the chains, so performing a dual purpose by preventing any mud from the upper portion of the machine falling on to the chain drive to the detriment of the wearing qualities of the latter, and at the same time preventing the chains from slinging liquid mud over the machine. The excellent qualities of the Morgan runabout are well known, but in wet weather, when there is a considerable amount of surface water and liquid mud, the tail portion of the machine often becomes bespattered with dirt. Owners who may have experienced this trouble will be glad to know that Mr. Jaffa intends placing the guard on the market. Its design, as well as the special attachments, are shown in the upper illustration. The downward extension envelops the tyre and acts as an extra screen for the gear box and the change-speed operating mechanism.





An effective transmission guard designed specially for Morgan Runabouts. One of the guards is shown fitted to the Grand Prix Morgan illustrated

NO PETROL FOR NEW MOTORISTS.

THE Petrol Committee announced on Monday afternoon last that, in view of the urgent necessity which has now arisen for further limitation of the consumption of motor spirit, it will not be prepared to issue licences on any applications received after yesterday (Wednesday), the 24th inst., unless such applications are for the renewal of licences which have expired in the ordinary course. The committee cannot undertake, however, that it will be able to issue renewals on all applications received from holders of motor spirit licences, and in any case it may be necessary to reduce the quantity of motor spirit at present allowed. Every effort will be made to avoid disturbance of the existing arrangements under which the committee receives applications.

MANUFACTURERS AND NATIONAL SERVICE.

WE learn that the deputation of manufacturers appointed by the Motor Cycle Manufacturers' Union has not yet seen Mr. Neville Chamberlain, the Director General of National Service, nor had an appointment been made at the beginning of the week.

Importance of Overseas Trade.

At least one important firm of motor cycle manufacturers has been granted a permit to continue the manufacture of motor cycles, with the stipulation that they are for export only. The notice is subject to one month's cancellation. The efforts of other firms to obtain a permit to continue the manufacture of motor cycles, even on the understanding that their energies would be devoted entirely to Overseas trade, have not been successful, but many are still hopeful that the authorities will grant permits before the date of the expiration of the old licences, viz., February 15th.

FARM TRACTOR DRIVERS WANTED.

WE have been asked to secure immediately twelve men for driving motor tractors and ploughs to be engaged on agricultural work of a very urgent nature in Scotland. Experienced drivers are essential. These men are badly wanted, and we might add that every day saved in placing them at work is of great value from a food supply point of view. Motor work on agriculture is likely to become a very important sphere of duty for motorists in the future, and the experience to be gained by men who take up the above positions will be invaluable. We are confident that a sufficient number of offers of service from men (preferably over military age) well qualified for their duty will be forthcoming, and we have undertaken to test applicants where necessary, and place them at the disposal of the Government forthwith. All communications to be addressed by letter to Iliffe and Sons Ltd., 20, Tudor Street, E.C.; Coventry; or Century Buildings, 199, Deansgate, Manchester.

PATRIOTIC PROBLEMS.

MR. E. T. NORTH, at an address to the Sales Managers' Association, advocating the adoption of an official British national trade mark, stated that in 1913 British men and women spent 35s. on German productions to every 3s. 11d. the Germans spent on British productions. It is to be feared that motor cyclists contributed not a little to these results, but now that we have our huge magneto and accessory factories it will be a poor look-out for German goods after the war.

AN HOUR ON A FAMOUS ROAD.

THE Birmingham-Coventry road last week-end was lively with motor vehicles of all descriptions, in spite of its glassy surface. A sidecarist, evidently anticipating frame breakages, took to the pathway to avoid the hills and dales of the roadway. A few minutes afterwards a war lorry came racing along at a speed of at least thirty miles an hour, doing more damage to the surface than fifty cars could do in the time. After an interval a sidecar ambled along in a drunken fashion, with the lug of the eye bolt broken owing to the enormous pot-holes. The riders had come from Rochdale, and state that, if possible, the roads in that district are even worse than near Birmingham. It was interesting to observe the various solo riders on the icy surface. Some rode in serene confidence, most of these being, curiously enough, riders of single-cylinder machines; others pottered along in agony of suspense, inviting a skid by swinging their legs free of the footboards. Movement of the legs is very likely to upset the balance of a machine on a slippery surface.

TWO-STROKE ENGINES IN AMERICA.

IN America the motor boat is the forerunner of the railway—the forerunner of civilisation. Every city and mining camp, where water transportation is possible, has its fleet of gasoline launches, ranging from the racing mammoth to the converted canoe. Two-stroke engines are widely used, and small, light, two-stroke power units, suitable for the smallest of craft, have long enjoyed a tremendous market in the States. This fact makes it all the more curious that the American two-stroke motor cycle has taken so long to materialise.

"UNE SAUCISSE."

Captive "sausage" balloons are used extensively on both the French and British fronts. The Germans, of course, possess similar contrivances. It will be remembered that just before the great Somme offensive our airmen succeeded in bringing down practically all the enemy's captive balloons which hovered over that particular sector A despatch rider's machine is seen in the foreground. (*Vise par le Ministere de la Guerre.*)

A WAR FUND CARNIVAL.

The East London M.C.C. (South Africa) recently held a carnival in aid of a convalescent home. It will be seen by the photographs that many of the fancy dresses were most effective. The club has thirty-six members at the front in German East Africa and Europe. Weare indebted to the Vice-captain E.L.M.C.C. (W. E. Courtney) for the photographs.

AVERAGE PRICES.

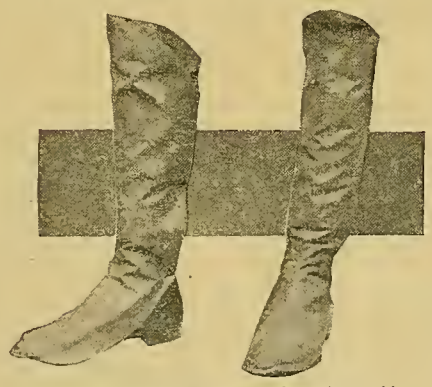
WE give below the average prices of second-hand models offered for sale in *The Motor Cycle*. Where it is possible to obtain a sufficient number of each model the average for the past week is quoted, otherwise the last average is given, if within four weeks. Difficulty in obtaining a sufficient number of one particular model often arises, owing to the fact that many advertisers omit some of the most essential details.

Make.	Year.	H.P.	Average for last week.	Latest weekly average obtainable.
A.J.S.	1916	6 3-sp. sidecar	£95	—
,,	1913	6 3-sp. sidecar	£48	—
,,	1915	2¾ 3-speed	—	£40
,,	1916	2¾ 3-speed	—	£52
Allon	1916	2-stroke, 2-sp.	—	£38
Ariel	1916	5 3-sp. sidecar	£76	—
Bat	1913	8 2-speed	—	£39
Bradbury	1913	4 3-spced sidecar	£32	—
B.S.A.	1916	4½ 3-sp. sidecar	£60	—
,,	1916	4½ 3-speed	£55	—
,,	1915	4½ 3-sp. sidecar	£55	—
,,	1913	4½ F.E.	£30	—
Calthorpe	1916	2¾ 2-speed	—	£25
,,	1915	2-stroke	£20	—
Clyno	1913	6 3-sp. sidecar	—	£40
,,	1914	6 3-sp. sidecar	£56	—
Connaught	1914	2-stroke	£18	—
Douglas	1916	2¾ W.D.	—	£50
,,	1915	2¾ 3-speed	—	£48
,,	1915	2¾ 2-speed	£42	—
,,	1914	2¾ 2-speed	£39	—
,,	1913	2¾ 2-speed	£30	—
,,	1916	4 3-sp. sidecar	—	£70
Enfield	1916	6 2-sp. sidecar	£80	—
,,	1916	3 2-speed	—	£47
,,	1915	3 2-speed	—	£38
H.-Davidson	1916	7 3-sp. sidecar	£82	—
,,	1915	7 3-sp. sidecar	£70	—
Humber	1914	3½ 3-speed	—	£35
Indian	1916	Powerplus sidecar	—	£83
,,	1915	7 3 sp. sidecar	£59	—
,,	1915	5 3-speed	£51	—
James	1915	4½ 3-sp. sidecar	—	£68
Levis	1915	2½ 2-stroke	—	£20
,,	1916	2½ 2-speed	£28	—
Matchless	1915	8 3-sp. sidecar	—	£65
New Hudson	1916	2-stroke	—	£34
,,	1915	2-stroke	—	£21
New Imperial	1916	2½ J.A.P.	£29	—
Norton	1916	3½ 3-speed	—	£48
P. & M.	1914	3½ 2-sp. sidecar	—	£55
Premier	1914	3½ sidecar	£42	—
,,	1914	2½ lightweight	£21	—
Radco	1914	2¾ 2-stroke	£15	—
Rover	1916	3½ T.T.	—	£56
,,	1915	3½ 3-speed	—	£46
Rudge	1913	3½ Multi	£28	—
,,	1915	3½ Multi sidecar	—	£45
,,	1914	3½ Multi	£40	—
Scott	1916	3⅜ 2-sp. sidecar	—	£58
Sunbeam	1916	8 sidecar	—	£100
,,	1916	3½ 3-sp. sidecar	£79	—
,,	1915	3½ 3-sp. sidecar	£70	—
Triumph	1915	4 sidecar	—	£60
,,	1914	4 sidecar	£47	—
,,	1913	3½ sidecar	£35	—
,,	1915	2¾ baby	£32	—
Zenith	1916	8 sidecar	£80	—
,,	1915	6 Gradua	—	£48
,,	1914	Gradua	£43	—

THE CYCLOSPAT LEGGING.

WE have received from Messrs. Brown Bros., Ltd., Great Eastern Street, London, E.C., a sample pair of their new Cyclospat leggings, which are designed chiefly to meet the demands of those who use their machines for short journeys, and who wish to protect not only their clothing but their boots from road splash. The leggings are quite suitable for serious touring, but they will appeal particularly to the man who uses his machine chiefly for short runs, which do not necessitate the donning of a whole suit, on account of their lightness and the ease with which they can be slipped on and off.

A distinctive feature in the Cyclospat legging, which we think might be more generally followed by overall manufacturers, is the toe-piece with leather sole,



The Cyclospat, a very handy and quickly adjusted overall or legging specially suitable for short and frequent journeys.

which fits over the toe of the rider's boot, thus preventing water from entering at the lace-holes, and also keeping the boot dry and clean. The nuisance of muddy boots is entirely eliminated by this simple extension—a point which will appeal strongly to business riders and doctors.

The Cyclospat leggings are made of durable waterproof material, and are attached by elastic bands and snap fasteners. Three sizes are supplied, the retail price being 4s. 6d. per pair.

ROTARY-ENGINED MOTOR CYCLES.

IT must not be supposed that a rotary engine is anything new on a motor cycle. Those older motor cyclists and people connected with the trade about twelve years ago will recall the Barry rotary-engined motor bicycle, which was produced at Barry (Cardiff), and exhibited first at the Stanley Show, Islington, in November, 1904. An improved design of the same engine was also exhibited outside one of the earliest Olympia shows. The engine was kept running almost continuously during show week, as was evident from the amount of oil which it had flung about. The original 1904 engine was a four-stroke, and had two opposed cylinders on one crank case, the opposite arms of the cross forming a gas chamber and a silencer respectively. Its weight was 15 lb., and the complete bicycle 70 lb. A later model was illustrated in *The Motor Cycle* of March 13th, 1905, wherein the engine was lower in the frame, and enclosed with a perforated cover instead of a plain one. For years the inventor bravely stuck to his task and eliminated many troubles which had manifested themselves, but of late years we have lost trace of the engine and its clever designer.

In submitting to the Editor articles, photographs, or drawings, contributors are asked to mention whether the illustrations are exclusive, and further to enclose a stamped addressed envelope for return of unaccepted contributions.

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

VAPORISATION AND VIBRATION.

Sir,—With reference to Mr. A. H. Burslem's vaporiser for heavy fuel, I suggest that the vibration of a motor cycle would upset the thermo-syphon action. The heat of the water, if boiling, which is not likely, would hardly be great enough to effect much of a change; and the design on page 38 does not show enough difference in the in and out tube levels to create the syphon action.

(Pte.) W. E. SLEIGHT.

LIGHTWEIGHT TRANSMISSION.

Sir,—*Re* your article in *The Motor Cycle* of January 18th, I have recently taken delivery of a 1917 Diamond-Jap motor cycle. This machine is fitted with Enfield two-speed gear and chain-cum-belt transmission, such as is specified as ideal by "H.M.B." From my experience, so far, it has proved to be the sweetest driven motor cycle I have ever sampled, not excepting all belt-driven two-strokes. The clutch action, as the writer states, is exceptionally useful for restarting on hills and for traffic work. R. HUMPHREYS.

BEARING PRESSURES.

Sir,—I have only just returned from France after coming in contact with a Hun infernal combustion engine, which has left me with a fractured thigh. I have been almost out of contact with the motoring world for a couple of years, and it is refreshing to find still the same old arguments of long v. short stroke engines. My experiences show that the long stroke is decidedly the cooler of the two, which is the chief thing in continuous running.

I consider, in my humble opinion, that the question of bearing pressures is largely a matter of leverage. Thus, the greater the distance between the axle and the big end the greater the strain on the side bearings.

The lever tendency on the upper part of the explosive stroke puts more strain on the axle bearings on the long stroke engines than on the short stroke as the distance or length of lever is greater, and at the same time the long lever gives more power to be transmitted to the road wheel. So the advantages are about equal in each case.

(Pte.) W. E. SLEIGHT.

WATER INJECTION IN A PETROL ENGINE.

Sir,—In the issue of January 11th some interesting points are raised with regard to the introduction of water into the cylinder of an internal combustion engine in an attempt to combine the use of steam and gas expansion.

Your correspondent "W.M." says, "Evidently there is a fly in the ointment," and then he cites two claims against water injection. The first objection he brings forward concerns the impurity of water. Surely "W.M." could use distilled water. If he objects to the bother of distilling the water there is still another method which he unwittingly suggests himself. Your correspondent informs us that when the water is changed into steam, the impurities are left behind in the cylinder. It would be a simple matter to have a small generator in the exhaust pipe and then lead the steam around the cylinder, between the fins, to some convenient place of admission.

To the best of my knowledge there is no sulphur in good motor spirits, but were this element present it would not be the cause of valve corrosion, as "W.M." suggests. Sulphur trioxide (*not* sulphur) when dissolved in water forms sulphuric acid ($H_2O + SO_3 = H_2SO_4$). A very small quantity of sulphurous acid would be formed, but this unstable acid has not the harmful effects of H_2SO_4. In time a little sulphuric acid would be formed—the reason cannot be given here—but the bad effects would be negligible. Thus "W.M.'s" second objection is dispelled.

If steam is subjected to a very high temperature it breaks up into its two constituents (oxygen and hydrogen). The oxygen would mix with the explosive "mixture," and so form a more violent detonation when ignited. The hydrogen would also burn, producing water which would change to steam, and then go through the same process as just described. Thus it will be seen that water will be produced in fairly large quantities. It is possible that the H_2SO_4 produced would unite with the water, generating great quantities of heat and forming hydrates of $H_2SO_4 \times H_2O$, which would pass out of the engine. Perhaps the excess of water and heat are points which are the real disadvantages of water injection. Much can be written on this subject and conflicting theories advanced, but "the proof of the pudding is in the eating." G.R.H.

Newcastle-on-Tyne.

DECARBONISING FLAT TWINS.

Sir,—In your issue of January 18th, in an article by Mr. Eric Williams, the writer states that "flat" twins in most cases have to have the whole engine taken out for decarbonisation, etc.

I think this is rather a sweeping statement, although I do not hold any particular brief for flat twins, in spite of the fact that I ride one, a 500 c.c. Brough, also a 3½ h.p. single o.h.v. Martin-Jap, in which case the crank case has to be dropped to remove the cylinder.

In the case of the Brough both cylinders can be removed for decarbonising, *without* moving the crank case, quite easily. The magneto can also be removed by loosening two nuts and the Bowden control; it then slides off intact. I have no connection with Messrs. Brough except that of a satisfied user, but think the statements above referred to rather unfair on the whole "breed" of flat twins—after all, not very numerous. C.L.C.

High Wycombe.

CAN THE LIGHT CAR EQUAL THIS?

Sir,—I was very pleased to see my Powerplus Indian double-seated turnout illustrated in *The Motor Cycle* of January 11th. I may say that I bought the turnout from Mr. Haste last year, and it was the identical photograph which you reproduce that he sent to me and which induced me to buy it.

But I certainly would not advise other motor cyclists to ride with this load unless they are absolutely certain of the couplings or attachments.

I pointed out to Mr. Haste at the time I bought the turnout how he was risking their lives, as there was not a sturdy coupling on the sidecar chassis; in fact, when I arrived at Chester (240 miles from Ipswich, I started at 7.30 a.m. and arrived at Chester 6.30 p.m.), there was not a single coupling tight. Luckily I did not have a passenger.

After I got it home I discarded all the original couplings and fitted a complete set of Mills-Fulford, which made a job of it. Now I can with safety take myself (over 12 stone), my wife (14 stone), and my two daughters (9 and 10 stone). I have taken my family from Chester to Llandudno and round the Marine Drive, and only had to use the low gear for the last bit.

I have fitted several little improvements, such as front guard side shields, rear guard ditto to keep the mud out of the springs, a pair of detachable leg shields, an extra handle-bar Bowden controlled air slide (which is top-hole both on pilot and main jets), and a sidecar light. J. HORSWILL.

THE FLAT TWIN AT THE BAR.

Sir,—I was pleased to see that Mr. Bradshaw replied to my letter, though I am sorry he does not reply fully owing, as he states, to my lack of technical information. I do not see what technical information Mr. Bradshaw requires; I like to leave out technicalities when in conversation or correspondence, because I have found that such a course generally is more desired by the motoring public, who are not all designers or engineers, and I have not found it necessary to impress one's technical knowledge upon everyone.

With regard again to the "hot side" and "hot top" controversy, I, like Mr. Bradshaw, will also leave it to the general motor cycling public to judge whether they would rather have cylinders cooled with the oil and the piston in addition to the radiators provided than have them not cooled at all and then experience pre-ignition and burnt up plugs.

With regard to the claim of Mr. Bradshaw that the A.B.C. aims at improved cooling, smoothness, capacity for continuous heavy duty, and correct and regular oiling, I will reply to these in their order.

Cooling.—From what I can gather the A.B.C. has nothing exceptional in this respect; in fact, the plugs show that it is rather hot on the top, and the fact of steel being used for cylinders, and the amount of experimenting and the change of designs which have been necessary to obtain this cooling, rather leads one to believe that it is not all that could be desired in this respect, although its designer may think so. I see nothing the matter with the cooling of the "Douglas," which has cast iron cylinders and side-by-side valves.

Vibration.—On this subject the "Douglas" and other horizontal twins with which I have had experience are as equally vibrationless as the A.B.C. (I mean by this it is not necessary to have a horizontal twin with steel cylinders, and incidentally a lot of correspondence about rude shocks, and pitiable sketches, hot sides, etc., to have a good engine). This is really the only reason why I "butted in" on this subject.

Exceptionally Long Life.—It is impossible to tell whether an engine has exceptionally long life until there are many on the road in the hands of the general public pulling sidecars. An engine which has exceptionally long life must be made of exceptionally fine materials and be exceptionally machined with no errors in the design. If these qualities are embodied in it, it cannot help giving long life. The same remarks apply to Mr. Bradshaw's claim for "correct and regular oiling."

Perfect Smoothness.—I think the M.A.G. engine excels in this respect, and will hold its own against any engine in the world, but it is not horizontal or flat.

Capacity for Continuous Heavy Duty.—The same remarks as above apply here.

Gear Box.—I see nothing extraordinary in an engine taking four speeds—any engine will, of course, but one prefers an engine that will do most work on one gear.

Cast Iron, etc.—I see that Mr. Bradshaw has not had time to go into the matter of mangles, etc. I should have thought that he would have investigated the excellent qualities of the best cast iron, such as is used on several air-cooled engines of high-class manufacture. The M.A.G. engine designer has found cast iron better than steel, and Mr. Bradshaw may be quite sure he would not use cast iron for his racing engines if steel were better. He once made them of steel until his experience taught him that cast iron could be obtained which was far better for wear, cooling, and absence of warp.

I was very happy to see that "A.A.S." upholds my remarks of December 14th. The design of overhead valves which he shows is somewhat similar to the M.A.G. racing engine, and also to most of the racing automobile engines, as well as, as "A.A.S." points out, the aero engines. I should think that if they were satisfactory on aero engines there is not much the matter with the system.

Some quite useful information has been given on the subject by Capt. Lindsay in your issue of January 11th, and as this gentleman has very great experience his remarks about overheated spark plugs and condensation in the inlet pipe in connection with flat twins are right to the point and absolutely correct. Capt. Lindsay states he has had as much trouble out of a horizontal twin in a month as he gets out of a single in a year.

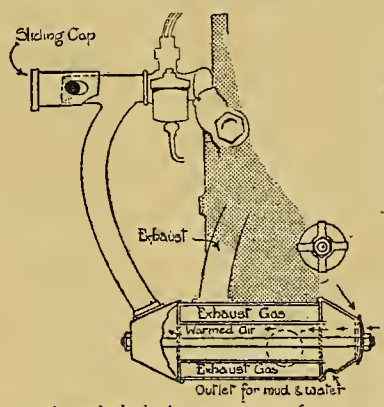
I was sorry to note that Mr. E. J. L. Strong read my letter in the light that he has, but I beg to assure him he is quite in error. I am pleased, however, that he was amused; I wish I could be amused during these times. As regards his friends, well it is one's duty at Christmas time to amuse people, especially the very young.

I have seen a letter from a Mr. Alf. Wray which is most amusing. He tells us, amongst other funny things, that the engine in question "is better designed than anything yet manufactured in the motor cycle world." So now we know, and there is no need to argue further on the subject—it is settled; but before concluding I would like to make one little remark. Mr. Wray tells us he was in the 1913 Tourist Trophy using an A.B.C. engine, but he does not tell us where he finished and why; he may have been amongst the also rans, but I didn't wait to see them come in. He also mentions he was in the practice for the 1914 race. Is that as far as he got in that year? Perhaps this is why he did not find spark plug trouble, cylinder warp, etc.

OSBORNE DE LISSA.

WARMING THE AIR.

Sir,—Perhaps this will be of use to a few Douglas riders troubled with freezing carburetters and indifferent fuels. It acts quite well, for the back of the carburetter is quite warm, even in the coldest weather. In fact, I have had to introduce cool air, as the too hot air made a difference of fifteen miles per hour on its maximum speed. The arrangement in regard to the silencer is to facilitate its coming apart, and also to prevent mud and rain from choking the air pipe.



A reader's device to prevent a frozen carburetter, and an aid to the vaporisation of heavy fuels.

The whole arrangement is fixed to the machine by the bolt passing through the silencer, and the tube nearest to the carburetter is loose and may perhaps slip off when a skid occurs.

The ordinary Amac carburetter very often collects rain around the sprayer; this does not happen now, thank goodness. Of course, it is not good practice to use hot air, but by the use of the sliding cap the air can be cooled just right. I wonder why something is not done to warm the carburetter shell itself.

FRED T. STEERWOOD,
Air Mechanic, R.N.A.S.

THE CASE FOR THE LONG STROKE ENGINE.

Sir,—I have been more than usually interested in the most recent numbers of your valued paper containing the discussion of the respective merits of the square and long stroke engine.

Mr. Norton does not compare the two in respect to cool running.

If, as Mr. Norton states, a long stroke engine of equal c.c. develops equal power to the square engine, on a higher gear, it will run cooler; also the greater the stroke in proportion to the bore the greater the surface area in proportion to the c.c., which means cooler running.

(Lt.) L. SAYER.

Sir,—Ably as Mr. Norton has stated the case for the long stroke engine in your issue of January 11th, there are still one or two points that appear to me to be rather obscure.

In the first place Mr. Norton is rather loose in his terminology. Why not use "pressure" in its scientific sense as "force per unit area," and work as the product of force into the distance through which it acts?

It appears to me that to equate "work" to "pressure," as Mr. Norton does "for simplicity's sake," is nothing short of scientific inaccuracy, which is to be avoided at all costs.

Again, does not Mr. Norton beg the question when he assumes that the total power transmitted by one stroke of the long stroke engine can be equalled by one of the

shorter stroke and then proceed to show that the short stroke would, *cæteris paribus*, only do 80% of the work of the long stroke?

Apart from minor considerations, surely the question is one of leverage. Given two engines (long and short strokes respectively) of equal capacity, working for any one stroke between the same two pressures P_1 and P_2 (the latter the difference between the pressure inside the cylinder and the atmospheric pressure at the moment the exhaust valve opens)—in the one case we have a greater force acting over a shorter distance, and in the other *vice-versâ*. The product of the two represents the work done, which, apart from defects in transmission, friction equals power transmitted. Hence "A.A.S.'s" assertion that the total "power" transmitted will be equal. It is quite obvious to the reader who has removed the blinkers of bias that this is what "A.A.S." is driving at.

We all know too well "the peculiarity of the long stroke engine of hanging on under load at low speeds especially," and surely no fairer criticism of this could be possible than to state that it "is not a help to long life for the bearings." Yet Mr. Norton inadvertently makes of this peculiarity an unqualified asset to the long stroke. Surely the fact of the matter is this. Every petrol engine, properly balanced and constructed, delights in "revs." "Revs" mean power and better balancing, and when properly lubricated every engine will stand up to the work, witness the four-speed A.B.C. Keeping up the revs. for this engine means "maximum of efficiency with maximum of refined running." But this is just what the long stroke does not do when it thumps over the brow of a long hill.

The section on "cylinder wear and piston ring pressures" is quite sound, and I think that here we have the explanation of the peculiarity of the long stroke of "hanging on under load."

I do not understand, however (perhaps Mr. Norton will explain), if we are dealing with two engines of the same capacity, where the increased angularity of the long stroke connecting rod *necessarily* comes in.

Oswestry. (Rev.) W. A. JONES, B.A., B.Sc.

SINGLE V. TWIN-CYLINDER ENGINES.

Sir,—Allow me to say a few words in reply to Messrs. Mullis, Cope, and Marks.

First of all, I should like to contradict their statements *re* experience. I have had quite enough experience with flat twins to realise their sterling qualities, and I certainly admit that they are very nice machines for town work, but I absolutely refuse to withdraw my statement about the engine pulling itself over in the frame.

Even if they *know* it is impossible, I can only reply that I have *seen* it happen, have verified the fact by testing the alignment of the sprockets, and can find several other people who have observed the same thing.

I do not judge a motor cycle from my ability to drill holes in the radiator fins, but, having had several years experience in the "shops," I know what I am drilling, and how to do it.

Perhaps Messrs. Mullis, Cope, and Marks have never experienced overheating on their Utopian Americans, and have consequently never heard of the well-known practice often used in the T.T., especially before cooling was brought to its present efficiency, of putting small copper tubes and springs through the fins to assist the cooling.

In conclusion, I may point out that there are not many makes of machines that I have not ridden, studied, and inwardly digested, and I do not remember a machine with quieter timing gear than the A.J.S. Disclaimer as usual.

H. St. V. ADDENBROOKE.

Sir,—I have read Capt. A. Lindsay's letter in your issue of the 11th inst., and regret that this is not sufficiently convincing to induce me, as he requests, to modify my views that a long induction pipe does not affect carburation.

If he means that on a cold day, and with the carburetter not heated in any way, the long induction pipe is inferior, I quite agree with him, but, given induction pipes of similar temperature and under the same conditions, a long induction pipe is far superior, produces a more regular beat of the engine, and is economical in fuel.

In car practice the carburetter or induction pipe is invariably heated, apart from the heat conducted from the cylinder walls of the engine. In motor cycle practice the general impression that heating is unnecessary has arisen principally from the fact that the carburetter is placed so close to the cylinder that the short induction pipe is actually heated by direct conduction from the cylinder, and to quite a reasonable extent.

The flat twin is a totally different proposition, as the carburetter is farther away from the cylinder than in probably any other engine, and manufacturers, not realising the enormous benefits of heated induction, have not paid sufficient attention to this point.

On the A.B.C. machine the carburetter was thought to be quite sufficiently heated until, on one or two excessively cold days, difficulties were experienced for the first two or three miles. Increased heating was applied with vast improvement in running at each attempt, and the heating is now so efficient that the carburetter itself is almost too hot to bear the hand upon.

The manufacturer of one of the best known carburetters in the world to-day once told me that, if he could, he would have a blowpipe playing on the side of the carburetter the whole time, and a long induction pipe to give the petrol time to vaporise thoroughly.

Capt. Lindsay surely is rather stretching the point when he states (referring to "Ixion's" trouble with a flat twin on an exceedingly cold night) that this experience comes at a very awkward moment for those who are trying to persuade us that long exposed induction pipes are an advantage. Perhaps he will be good enough to point out who used the word "exposed" as a *desideratum* in induction pipe design.

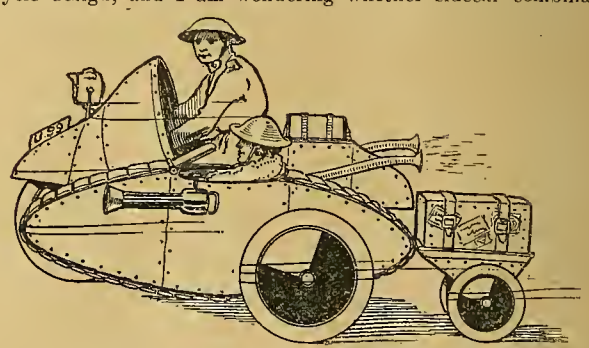
I am afraid that I cannot quite understand the following paragraph in Capt. Lindsay's letter: "If an engine can indulge simultaneously in an overheated sparking plug and a refrigerator inlet pipe, what constitutes a 'hot side'?" If he desires information on this point, I referred to it at some length in my article in your issue of December 7th, 1916, wherein I showed that an exhaust valve that is adjacent to one side of the cylinder has the effect of considerably increasing the temperature of that side of the cylinder, with the result that the cylinder walls are distorted, with undesirable effects upon the piston and piston rings. If, on the other hand, the paragraph in question is intended sarcasm, I have no desire to discuss this point further, and I do not doubt that the majority of your readers desire technical matters to be discussed in a technical manner.

With regard to the letter by "A.A.S." in your issue of January 4th, together with his sketch showing the valves at an angle in the head, as found in many aero engines of high efficiency, I might mention that I built large engines with valve gear of this type some years ago. We also manufactured cylinders of this type for our 500 c.c. engine early in 1915. Our speed model C is destined to have this valve gear (with slight modifications to suit air-cooled practice) immediately we resume our motor cycle production. GRANVILLE E. BRADSHAW.

A POST-WAR MODEL SIDECAR.

Sir,—No doubt the war will have a great effect on motor cycle design, and I am wondering whether sidecar combination makers will supply a model to suit our "Tank" officers and men after the war. Possibly the design I enclose will appeal to them. ROYAL SUSSEX.

Eastbourne.



Will battlefield fashions develop thus?

A WINTER ROAD TEST OF A LADY'S MODEL FLAT TWIN.

I HAD long promised myself a test of the lady's model Douglas, and one foggy and miserable morning a few weeks ago, to my pleasure, I received a wire from the London depot notifying its arrival. Some thoughtful person had left just enough petrol in the tank to cover the road distance between the depot and home. The motor cycle was new, spotlessly clean, its plated parts reflecting one's image in various distortions. In striking contrast, the roads were about as filthy from the trampled snow as I have ever seen them. It went to my heart to ride the mount for the first time under such unfavourable conditions, but after all what are motor cycles manufactured for but to drive, both in good and bad weather?

It was the model known as the X model, with the well-known 2¾ h.p. engine and open frame. The three-speed gear box, clutch, and kick starter are similar to those of the 4 h.p. model. The gear handle was already in the neutral notch, so I flooded the carburetter and gave the kick starter a mighty kick. I have been accustomed to handling a big twin, and the mighty thrust not only started the engine, but almost upset the balance of both myself and the machine. It requires no superhuman strength to start the Douglas, as the engine depends more upon revolutions than compression for its efficiency.

The frame is low and the large, comfortable footboards offer many changes of position. The specification is too familiar to make it necessary to dwell upon details, and the design has been well thought out for the lady rider. One feels so near the ground and the pull of the engine is so regular that, although I rode the mount through inches of mud and slush, and again on a frosty morning, when the surface of the road was almost as slippery as glass, there was never any tendency to skid: none of that "tail-wagging" that even experienced motor cyclists find nerve wearing.

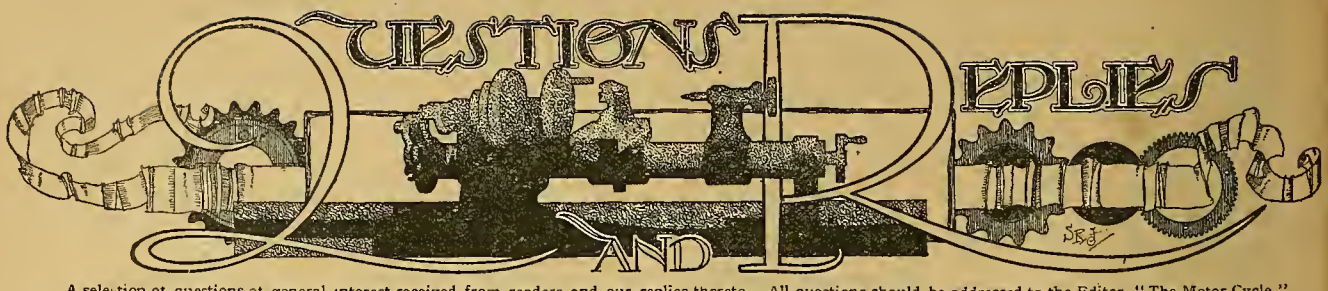
Efficient Mudguarding.

The aluminium covers give the motor cycle a very smart finish; these are held by butterfly nuts that are the work of a minute to remove with nothing but Nature's tools, the fingers. A small hinged door in the aluminium even saves one this trouble when access to the rear plug is required. The rider is well protected by the flanged mudguard; the front mudguard is so ample that I noticed when riding through puddles that a small stream of water (which would on many machines find a resting place on the rider's skirt) was thrown along in front of the footboards. This guard might with advantage be copied.

I practically lived on the machine for some days, and have nothing but praise for the rapid acceleration and even running of the little engine; the machine is light to handle and easy to drive and manage. No lady rider could wish for a better solo mount. There is just one small point in which improvement can be suggested — that is, when the foot clutch is out the pedal interferes with the steering by catching in the front mudguard flange. This, however, can be easily remedied by a crook being made to allow for clutch pedal, and no doubt such a minor point will soon be remedied. I *was* sorry when the Douglas had to go back.

MAY WALKER.

A winter test of a lady's Douglas, a machine possessing a flat twin engine of 2¾ h.p., three-speed gear, and kick-starter.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C., and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Transferring a Registered Number.

I wish to have the number which is on the motor cycle I have just purchased second-hand transferred to my name. Will you please tell me how much the transfer will cost, and to whom should I apply?—H.G.

The transfer of a registered number costs one shilling, and application must be made to the county council where the machine was registered.

Removing the Gudgeon Pin.

My machine is a 2¼ h.p. two-stroke, 1914. Will you kindly tell me the correct method of removing the gudgeon pin? Both ends appear to be of the same size and to be fixed with copper rings.—W.

Unless the piston or ends of gudgeon pin are marked "in" or "out" to indicate which is the larger end of the taper it is probably simply parallel, and can be driven out in either direction. Take care that you support the piston well while driving the pin out.

Starting a Single-geared Lightweight.

I have a 2¾ h.p. two-stroke with which I experience difficulty in starting. It will start all right if I run with it for a few yards, but I would like it so that I could paddle it off from the saddle. This it will not do, even when warm. I have tried various size jets (Amac carburetter). The magneto timing is right, and corresponds with the makers' catalogue. It is a Dixie magneto. I am not desirous of repeating the acrobatic performances of a few years ago.—W.B.

A single gear machine will seldom start easily by paddling it off. The only thing to render starting as easy as possible is to go over everything, and make sure all adjustments are right, such as plug points clean and adjusted rightly; a gap of 1 mm. is about correct. Contact points clean and breaking properly, about .4 mm. Carburetter clean and the correct sized jet fitted. A fairly large jet is wanted for easy starting; when once started, if the right jet is fitted, you should be able to run with air lever fully open, but for starting the air should be closed and about quarter throttle given. What is wanted is a rich mixture, and only a little of it. Make sure that there are no air leaks in the induction pipe or crank case; a leaking oil pipe will sometimes give trouble on two-strokes, by allowing air to enter crank case.

Intermittent Misfire.

I have a strange trouble with my motor cycle, and cannot master it. Can you assist me? The machine is a 1914 2½ h.p. two-stroke; it seems to have plenty of power, and is as speedy as usual. Compression is good. On the road it misses fire about one explosion in twelve continually, and on the stand it simply will not two-stroke: the engine travels at a terrific speed, and loud reports keep coming apparently from the silencer. I have had the engine taken down twice, cleaned, etc., by good, reliable mechanics, also I have written to the makers, and they are at a loss to explain it. Petrol pipe and carburetter are perfectly clean, also magneto (Ruthardt) gives a good, fat spark, and I have tried about six different plugs which have been tested in other motor cycles. When running on the stand, if I apply brake hard the machine runs about the same as on the road.—F.W.R.

It is extremely difficult to advise you without seeing the machine, as so many small defects may exist which to the unskilled eye may appear to be in order. A two-stroke will hardly ever run evenly on the stand or when running light. The most likely cause of the intermittent misfire is some fault in the ignition system—probably the contact breaker, the contact points of which may be inclined to stick at intervals. See that the rocker is quite free, and that the points are breaking properly and separating about .4 mm. Also see that the carbon brush and holder are in good order and quite clean. The reports from the silencer also indicate faulty ignition. Too large a jet causes four or eight-stroking, while too small a jet or one which is choked will cause popping in the carburetter. We think, however, the trouble lies in the magneto, and if you very carefully overhaul all parts of this your trouble will cease.

DELAYS IN POSTAL DELIVERIES.

In view of depleted staffs, the curtailment of railway services, and the consequent delay in delivery of mails, readers will greatly assist by forwarding communications (including advertisements) as much as possible in advance of the dates of the issues for which they are intended.

Sticking Rocker Arm.

My magneto (Bosch ZE1) rocker arm sticks. How is this removed? I understood the whole contact breaker could be removed by simply withdrawing the centre screw, but it will not come off, though this screw has been removed. I do not care to use much force in case there should be some other fastening than this screw. If you will assist me I shall be grateful.—A.M.

To remove the contact breaker rocker arm remove the centre screw and prize the contact breaker off by means of two small screwdrivers. It is fitted by means of a taper and key. If done carefully the rocker arm can be removed without disconnecting the main springs by levering it carefully out of its bearings by means of a penknife or small screwdriver. If you cannot remove it this way you will have to remove one of the small screws which holds the spring to the rocker. When removed from the contact breaker body you can reamer out the fibre bush by means of fine emery cloth wrapped round a match.

Running on Substitutes.

I am running a 7 h.p. Indian on a white oil substitute with 10% petrol. It runs well, but "soots up" quickly. Would naphthalene balls added to this mixture stop the "sooting up," and if so, would there be any fear of explosion of the tank on a hot day? I shall be greatly obliged if you will answer the above question.—J.H.B.

The sooting, or oiling, up which you experience when running on petrol substitute is most likely due to insufficient heating of the mixture before entering the cylinders. All incoming air should be drawn from some main portion of the engine by means of an air scoop. If an ordinary Indian carburetter is fitted, this fitting is, of course, standard. In addition, the inlet pipes should be either warmed by means of a heated jacket or be heavily lagged with asbestos string and insulating tape. From personal experience, we have never found much gain by using naphthalene balls and similar specially prepared compounds, but we have heard of a number of riders who report very favourably upon their use. Most of our correspondents writing on the subject claim that when using petrol substitutes the naphthalene balls give sweeter running and less carbon and soot. The number of balls to be used would be about three to each gallon. There is no danger attached to their use.

Lubrication with Paraffin.

My baby two-stroke being petroil lubricated (which I find quite satisfactory), is it advisable to attempt to run on paraffin?—G.E.W.

Provided you arrange for the mixture to be heated before entering the engine, there is no reason why you should not run on paraffin, or at any rate a percentage of paraffin. You may find a slightly larger jet desirable owing to the heavier nature of the fuel. The oil mixture will work equally well with paraffin, provided proper provision be made to ensure perfect evaporation of the paraffin.

Starved Carburetter.

I have a Coventry Eagle two-stroke motor cycle which is very difficult to start up. It has been running on lubricating oil and petrol mixed—in the same tank. Also, when on the road, it will take but little air, sometimes going better with the air entirely shut off. Any suggestion will be gratefully received.—EAGLE.

Your trouble is evidently due to a choked or starved carburetter, or to having too small a jet fitted. When the petroil system of lubrication is used the oil frequently becomes congealed in the carburetter, so causing the jet and other working parts and passages to become choked up. If thoroughly cleaning out the carburetter and jet does not effect a cure, try fitting a slightly larger jet. Make sure all inlet joints are air tight and not causing air leaks.

Tips for Scott Riders.

I have purchased a Scott motor cycle, and I would like to have a few hints and tips on this machine. I should like to have the experience of one who has been the owner of a 1914 Scott machine.—T.J.D.

Pay special attention to lubrication. The big ends of this engine are provided with roller bearings, and the cylinders being water-cooled, the engine requires very little oil. Do not make the mistake of over-oiling. We find that the best plan is to keep the plunger of the lubricator clipped down, and depend upon the suction of the crank case for the working of the drip; also note carefully that both cylinders are getting the same quantity of oil. If you find that one cylinder is getting an excess, the supply can be modified by taking out the small nipple contained in the oil pipe on that side, and closing it up slightly by carefully tapping with a hammer. We would also recommend you to make a careful scrutiny for air leaks. Test the crank case joint by dropping oil on to it when the engine is running, also test the pin holes which secure the rods by which the cylinders are held on. The slightest air leak either about the crank case or in the induction pipe will entirely upset the smooth running of this engine. With regard to transmission, see that the countershaft is in perfect alignment with the engine. Do not be tempted to correct chain tension by running the countershaft out of alignment, or chain troubles are sure to ensue. For further advice on this subject see *The Motor Cycle* for September 14th, 1916.

Belt Slip.

I have a 3½ h.p. Rudge-Multi motor bicycle and sidecar. I find that belts are apt to slip badly. Is there any belt on the market which lasts and does not slip? Leather belts are the best I have tried up to now.—G.T.H.

Your belt probably slips through the pulleys being of the wrong angle. The correct angle is 28°. Leather belts are very apt to cause the pulley flanges to wear badly owing to the grit they collect. You should experience no belt slip, except perhaps on the lowest ratios, provided the pulley flanges are not worn.

Too Large a Jet.

I have a 2½ h.p. motor bicycle fitted with B. and B. carburetter. I find that I get an increase of speed on opening the throttle, but after a little more than half open no increase in speed is obtained. The machine takes full air when the throttle is half opened. Should an extra air inlet be required to enable the machine to run on full throttle?—NOVICE.

The symptoms lead one to suppose that you are using too large a jet, causing the engine to choke when you open the throttle beyond a certain point. An extra air inlet might get over the difficulty, but when you can cure the trouble by fitting a smaller jet this is obviously the best and simplest thing to do.

Sidecar Breakages and Cleaning.

Can you tell me what is the strongest and most reliable motor cycle? I have a 1915 3½ h.p. single with rather a heavy sidecar. This machine never causes me any engine trouble, but after anything of a ride I generally find something broken, and, as a rule, some nuts are off. I ought to say that for safety's sake I have had my sidecar fixed further from the machine than sidecars are as a rule, and this no doubt causes strain, and accounts for the trouble I have in losing nuts, bolts, etc., after anything of a run; but I think perhaps a stronger made machine would suit me better. Can you advise me? I should also like to know how a motor cycle ought to be cleaned. My man always washes it with water, but the people at the garage where I put up in our nearest town say it ought not to be washed with water, as it spoils the bearings.—R.M.C.

We regret that we cannot recommend any particular make of machine for obvious reasons. 3½ h.p. is hardly sufficient for serious sidecar work. A machine of at least 4 h.p. with two or three speeds and chain drive is really the most suitable type. If the sidecar is not correctly lined up, this might easily account for breakages. See that the sidecar is parallel with the centre of the motor cycle, and that when on level ground the bicycle stands perfectly vertically. Unless you thoroughly wash the machine in paraffin afterwards it is not advisable to wash the mud off with water. If, however, the worst is washed off with water do not let it go round the wheel bearings more than can be helped.

Clutch Slip.

I should be very much obliged if you would give me a little assistance respecting a trouble I am just experiencing with my machine. I run a 1913 3½-4 h.p. sidecar outfit. Armstrong three-speed hub gear. Up to just recently everything has been perfect, but I had occasion two months ago to renew the gear wheels in the hub gear, since which time there has been a slip somewhere. There is no trouble when running at a fair speed on the level, but directly I reach an incline or open out a little more the engine commences to race on any of the three gears. I have had the gear down again and thoroughly washed out the clutch and also gears, but there is very little improvement. I might say that I have fitted a new belt, so that there is not much chance of this being the trouble. I use ordinary thin engine oil for lubricating; would this be too thick? I sometimes have trouble in getting gears to change.—S.H.C.

We should say that the trouble is undoubtedly due to clutch slip. Ordinary engine oil is rather too thick, and we should recommend you to use oil suitable for plate clutches. Possibly stronger clutch springs are necessary. Make quite sure that everything is perfectly tight and in line as regards the control mechanism of the gear, otherwise you will have difficulty in changing. It is especially important that the change speed lever is a tight fit on the top tube and cannot possibly turn or shake loose. See the article on the subject in *The Motor Cycle* of December 7th, 1916, page 490.

EXPERIENCES WANTED.

"A.P.E." (London). — "Oxigene" mixed with petrol to cause decarbonisation of engine.

"S.T.C." (Beaconsfield).—Speed and hill-climbing capabilities of a racing Harley-Davidson or road-racing Indian.

RECOMMENDED ROUTES.

LOWESTOFT TO MANCHESTER.—F.K.B.

Lowestoft, Beccles, Norwich, East Derebam, Swaffham, King's Lynn, Swineshead, Sleaford, Newark, Mansfield, Chesterfield, Baslow, Chapel-en-le-Frith, Stockport, Manchester.

HARROGATE TO KIDDERMINSTER.—R.W.

Harrogate, Wetherby, Aberford, Ferrybridge, Doncaster, Mansfield, Derby, Burton, Lichfield, Sutton Coldfield, Birmingham, Halesowen, Kidderminster.

WOKING TO TEWKESBURY.—J.B.

Woking, Chobham, Bagshot, Wokingham, Reading, Wantage, Lechlade, Cirencester, Colesbourne, Seven Springs, Cheltenham, Tewkesbury. Approximately 103 miles.

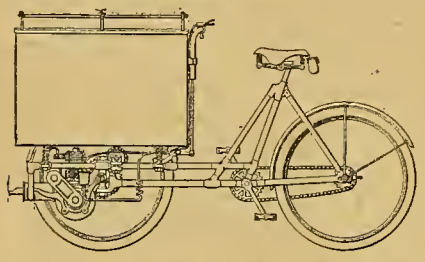
BUILTH TO FOLKESTONE.—X.Y.Z.

Builth, Hay Hereford, Ledbury, Tewkesbury, Stow-on-the-Wold, Chipping Norton, Woodstock, Oxford, Henley, Maidenhead, Windsor, Egham, Chertsey, Ripley, Cobham, Leatherhead, Dorking, Reigate, Redhill, Oxted, Westerham, Seal, Maidstone, Charing, Ashford, Hythe, Sandgate, Folkestone. Roughly 280 miles.

PATENTS by Eric W. Walford

A Tradesmen's Carrier.

Upon the steerable frame, which carries the luggage box, is mounted an engine, which, in the case shown, is of the two-



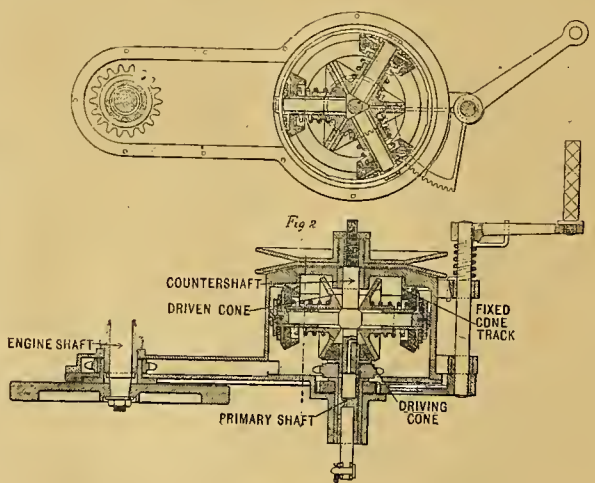
stroke type. This engine drives through a chain on to a countershaft, having a differential gear, the countershaft in turn driving the road wheels through spur gearing arranged in oiltight casings.—A. E. Lambourne and John Warwick and Co., Ltd., No. 102,110.

An Ingenious Friction Gear.

One advantage of friction gearing is that it provides a gradually variable effect, and the present construction is a neat adaptation of such gearing to a motor cycle countershaft. The drive passes from the engine-shaft to a sprocket keyed upon the primary shaft of the gear. This primary shaft can slide through the sprocket, and upon its inner end is fixed the clutch and driving cone. Co-axial with the primary shaft is the countershaft, and the latter telescopes within the former for support. The countershaft carries a number of radial arms, or spokes, and upon each of these is freely mounted a cone driven from the primary cone. Upon each radial arm is also mounted an outer cone, which is keyed both to the radial arm and to the corresponding driven cone. The outer cones run upon a fixed track in the gear housing, and between the pairs of cones on each radial arm is a spring which forces the driven cone inwards into contact with the driving cone. The gear is operated by sliding the primary shaft in and out through the keyed driving sprocket. When the shaft is in its outermost position the driving cone is free of the driven cones, and therefore revolves freely without transmitting its motion to these cones. On moving the driving cone inwards it first engages the driven cones near their peripheries, rotating these at a reduced velocity. These in turn rotate the outer cones on the radial arms, and these cones run round the fixed track carrying the radial arms, and consequently the countershaft, with them. As the driving cone is moved further inwards the driven cones are pressed apart against the springs, and the gear ratio is gradually varied. The countershaft is shown with a belt pulley for the final drive, and a kick-starter mechanism is incorporated, acting on a spur gear on the primary shaft.—G. J. Dallison, No. 101,896.

An Improved Release Valve.

By the valve shown, which is intended for use with two-stroke engines, it is not only possible to provide a free release for the gases, but a variable compression effect is obtainable. The body A screws into the combustion chamber and forms a seating for a poppet valve B, which is normally held closed by a light spring C. Above the domed washer on the valve stem is a stronger spring D, and the effect of this spring can be varied by adjustment of the abutment E, which is actuated by the bell crank lever shown. In use, when full release is desired, the disc E is moved downwards until the pressure of the spring D overcomes that of the spring C and the valve B opens. To provide a decompressor effect, the degree of pressure imparted to the spring D is such that it will open the valve B against the spring C, but allows the valve to close under the pressure produced when the piston has moved a certain distance up the compression stroke. The valve then remains closed during the firing stroke, and opens again when the pressure in the cylinder falls to zero.—J. Martin, No. 102,185.



Enfield Two-stroke Handbook.

A third edition of the Royal Enfield treatise dealing with their two-stroke model has just been published. The booklet is splendidly produced and illustrated like all Enfield productions.

SPARKLETS

No Address.

Messrs. C. Binks write stating that £2 12s. 6d. has been sent to them by a Mr. R. Ditwell without giving an address. The money will be returned should the goods not be required.

A New Catalogue.

We have before us the catalogue sent out by J. Pedley and Son, rubber manufacturers, Birmingham. It is a very comprehensive list, and exceedingly well illustrated. Everything a motorist requires in the manufacture of which rubber plays a part is shown.

Force Feed Oil Pump.

With reference to the Tanner lubricating pump described in our last issue, we are asked to state that models for testing purposes are in course of construction, and arrangements are being made for the manufacture of large quantities. Applications should be made to the inventor, Mr. R. L. Tanner, Lynmouth, Earlsdon Avenue, Coventry.

A Satisfactory Dividend.

Messrs. Simms Motor Units, Ltd., Percy Buildings, Gresse Street, Rathbone Place, London, W., advise us that for the financial year ended June 30th, 1916, a dividend of 25% has been declared on the paid-up capital of the company. An amount of £20,680 1s. 2d. has been carried forward, after making ample provision for depreciation, and the transfer of £4,000 to the reserve account.

Locating Faults.

We have at hand a booklet from the Lodge Sparking Plug Co., Ltd., entitled "Locating Faults in the Petrol Engine." The method the author has adopted in tabulating the symptoms, the troubles, and the remedies is admirable. The veriest novice will, in these concise hints, be able to grasp readily the remedies for various faults he may have with his engine. The booklet will be sent free to any reader who cares to apply to the Lodge Co., Rugby.

The Searle Unburstable Inner Tube.

We have received information that the County Chemical Co., Ltd., Chemico Works, Bradford Street, Birmingham, have taken over the sole selling rights for the United Kingdom and certain foreign countries of the Searle Unburstable inner tube. Our readers may remember that this tube has three plies of canvas incorporated in it, rendering it non-stretchable for the greater part of its circumference. On the tread of the tube is a pleat filled with elastic rubber, which allows the pleat to flatten out on the tube being expanded. The advantage of the tube is that, in the case of a tyre bursting, the tube is protected from damage. Every tube is tested to a pressure of 80 lb., unsupported by a cover, previous to being sold.

We regret

BOWDEN Wire, Limited, London, regret to announce that, being wholly engaged upon production for the British and Allied Governments, they are unable to execute any orders for private purposes until further notice. They have in stock certain goods suitable for replacements. Customers are invited to state their requirements in this respect, and, if possible, these will be met.

BOWDEN WIRE LTD LONDON

Godbolds

A manufacturer who supplies Magneto Parts from stock.

Recollect, we can supply the worn or missing part which is required to restore your magneto to its original condition. We manufacture "spares" for magnetos of all makes, so are able to quote attractive prices. If your machine needs thoroughly overhauling, send it on, and we will return it like new.

SIMMS MOTOR UNITS, LTD.,
PERCY BUILDINGS, GRESSE ST.,
RATHBONE PLACE, LONDON, W.

I SUBMIT there

is a solid reason why you should adopt a

BINKS CARBURETTER, viz.:

YOU CUT YOUR FUEL BILL IN TWO

if you adopt my system and use my fuel. You can, of course, use petrol or benzol without alteration.

Price of Carburetter complete—

49/-

plus 10% extra war cost.

FIT ANY MACHINE.

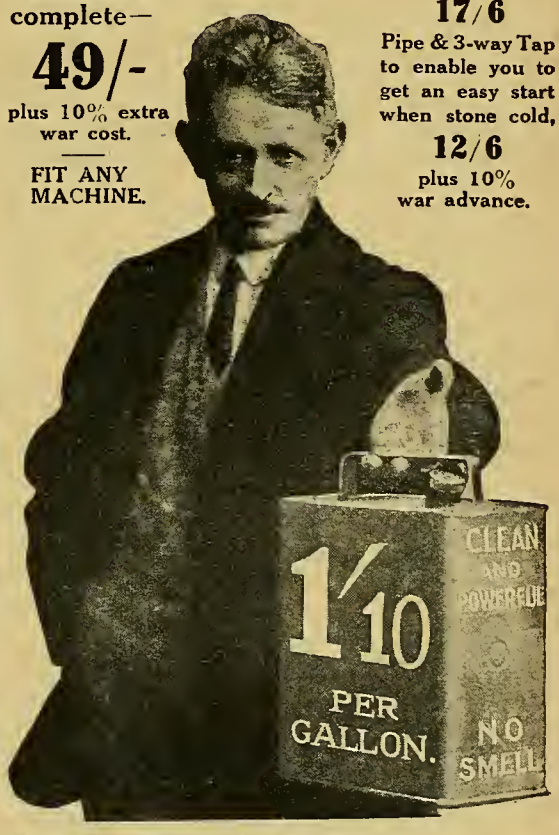
Small extra Tank to clip on Frame,

17/6

Pipe & 3-way Tap to enable you to get an easy start when stone cold,

12/6

plus 10% war advance.



READ!

MY 3-PHASE JET DAMPING CARBURETTERS

have such perfect vaporising properties that they enable you to use fuel at **1/10** per gallon in 42-gallon casks, which you are allowed to keep on your premises. Casks **12/6** each, returnable at **10/-** each. Your engine will tick over dead slow, and pull dead slow in traffic, yet give the full power. It is almost impossible to tell you are not running on petrol at **3/-** a gallon. It cannot damage your engine or soot it up and makes Motor Cycling possible in these times.

I give you my personal assurance of the truth of what is stated above. Please send at once for full particulars of the carburetter, and also for my Treatise on Carburation, and terms of One Month's Approval Trial.

C. BINKS, Ltd., Eccles.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed ——— & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle" Coventry, or London (20, Tudor St., E.C.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed, "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged, when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

1915 5-6h.p. Abingdon, 3-speed, lamps, etc., coach-built sidecar, hood, screen, numerous spares; a good lot, and cheap; £55.—Jones, Garage, Broadway, Muswell Hill. [7692

A.J.S.

A.J.S., 2¾h.p., 3-speed, ready at works; £58.—Bull St. Giles' Sq., Northampton. [X5052

A.J.S. 6h.p. 1914 Combination, hood and screen; £60 —Baker and Sons, 35, Friar St., Reading. [X4936

A.J.S. Spares prompt delivery.—Cyril Williams, A.J.S Agent, Chapel Ash Depot, Wolverhampton. [X4094

A.J.S., 1913, in perfect condition, 6h.p. twin, and coachbuilt sidecar.—Albon's, 119, Ripple Rd., Barking, Essex. [7588

LATE 1914 6h.p. 3-speed A.J.S. and sidecar, in almost new condition; any trial; £56.—Else, Daisy Bank, Matlock. [X5106

A.J.S. 6h.p. Latest Model De Luxe Combination upholstered scarlet, 3 best lamps, screen, hood and apron, spare wheel and tyre unused, watch, speedometer, many spares, mileage 3,000 only, condition new; any trial by appointment; £95.—48, Strathbrook Rd. Streatham Common. [X4924

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

ANY MOTOR ANY PRICE BEST ATTENTION BEST ADVICE.

GODFREY'S can supply from stock both New and Second-hand Machines, for Cash or on the easiest of Easy Terms.

GODFREY'S will make you a liberal allowance for your old mount in part exchange, or will purchase outright for cash at your option.

Whatever your requirements, write to GODFREY'S, and you will be sure of receiving the very best attention.

If you seek advice, you can command the services of practical experts, free for the asking.

If you have an hour to spare, call at GODFREY'S Showrooms, and you are welcome to look round without any obligation to make a purchase.

The name of GODFREY'S is a guarantee for a straight deal.

Write for full Lists of New and Second-hand Machines.

GODFREY'S LTD.

208, Great Portland Street LONDON, W.

'Phone: 7091 Mayfair (2 lines).

MOTOR CYCLES FOR SALE.

Alldays.

1916 2-speed Alldays Allon, brand new, shop-soiled, not scratched; £40 cash.—Jones, Garage, Broadway, Muswell Hill. [7698

ALLDAYS Allon, 1915 model, used about 2,000 miles, condition as new; £30.—Apply, Massey and Rossiter, Ryley, Surrey. [X4943

ALLON, 1915, 2-stroke, 2-speed, lamps, horn, etc., splendid condition; £27.—F. B. W. Batt, 55, Rumbridge St., Totton, Hants. [7444

ALLON.—All 1917 models in stock, 36-45 gns.; exchanges and deferred payments arranged.—Maudes', 100 and 136 Gt. Portland St., London, W. Tel.: 552 Mayfair. [7387

ALLON, 2-stroke, late 1916, new condition, 2-speed countershaft gear; £35, offer, or exchange 3½h.p. combination, cash either way.—W., 141, Norwood Rd., London, S.E. [7488

ALLONS, all models, actually in stock, £37/16 to £47/5; exchanges, deferred payments; also 1915 2-speed clutch model, £36/10; and 1915 single-speed, £27/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169, and Hornsey 1956. [7502

Ariel.

ARIEL, 3½h.p., latest 3-speed model, actually in stock.—Crow Bros., Guildford. [6366

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

RIDER TROWARD'S, 78, High St., Hampstead.—1913 Ariel, 3½h.p., variable gear, re-enamelled, overhauled; 19 gns. [7546

ARIEL, 3½h.p., B. and B., complete with lamps and spares, good condition; bargain, £18.—Keale, Glebe Rd., Staines, Middlesex. [7606

ARIEL, 1917, 3½h.p. machine actually in stock; £65/10; exchanges, deferred payments if desired. —Lamb's, 151, High St., Walthamstow. Tel.: Walthamstow 169. [7499

ARIEL, the reliable motor cycle, 3½h.p. single, and 5-6h.p. twin models; delivery from stock.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0889

I CAN Give Immediate Delivery of 1917 5-6h.p. Ariels, 3½h.p. Ariels, solo or combinations; exchanges or deferred payments.—Jones, Garage, Broadway, Muswell Hill. [7699

Arno.

ARNO, 2¾h.p., B. and B., mag.; would exchange for His Master's Voice gramophone and records, or sell £12.—H. Marsh, 14, Westminster Rd., Handsworth. [X4907

Auto-Wheels

AUTO-WHEEL, 1916, B.S.A. Model de Luxe, new; £13/13.—Plastow, Grimsby. [X5055

AUTO-WHEEL, 1915, unscratched; 10 gns.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7186

1¼h.p. Auto-wheel, up-to-date model, single lever control, complete with stand and fixing clips; £9/15. —Wauchope's, 9, Shoe Lane, London. [7577

AUTO-WHEEL, late 1915 Model de Luxe, B.S.A., Hammond shock absorber fitted, in perfect order; £9/10.—Box 666, c/o *The Motor Cycle*. [X5005

AUTO-WHEEL, only run about 300 miles, perfect; £10/10, a bargain.—Harrods, Ltd., Motor Cycle Dept., Basil St., Brompton Rd., London, S.W. [7463

AUTO-WHEELS (two), B.S.A. models in stock, £9/15 and 12 gns. each; deferred terms if desired.—Lamb's, 151, High St., Walthamstow, also at 50, High Rd., Wood Green. [7497

Bat.

BATS.—Latest 4-5h.p. sporting model in stock, 2 speeds, etc.; £63/5.—Below.

BAT, 5-6h.p. sporting model, 3-speed hub gear, usual accessories, good condition; £32.—P. J. Evans, John Bright St., Birmingham. [X5039

BAT-J.A.P. 1913 7h.p. Twin, Bosch; must sell; £19/19.—1, Ebner St., Wandsworth. [7519

Blackburne.

RIDER TROWARD'S, 78, High St., Hampstead.—3½h.p. T.T. Blackburne, single gear, very fast, perfect order; 21 gns. [7537

Bradbury.

1912 Bradbury, in good order; £13.—Cross, Jeweller, Rotherham. [X5072

RIDER TROWARD'S, 78, High St., Hampstead.—1913 Bradbury, with 1915 3-speed gear and clutch, good order; 23 gns. [7548

BRADBURY, 3½h.p., 1913, 2-speed, and Millford sidecar, overhauled; £35; extended payments arranged.—Service Co., 292, High Holborn, London. [X4987

BRADBURY, 1912, 3½h.p., good order, 2-speed, free engine, tyres excellent, tools, lamps, spares; low price for quick sale, £17/10, bargain.—Bissell, Sutton Grange, Kidderminster. [7625

MOTOR CYCLES FOR SALE.

Bradbury.

1913 4h.p. Bradbury, and coachbuilt sidecar, 2-speed N.S.U., free engine, lamps, speedometer, new extra heavy Dualop on back, in splendid condition; trial; £28 —Perkins, Bolfour St., Leicester. [X5078

BRADBURY, 4h.p., N.S.U. 2-speed, new Dunlop tyres, spare tube, lamps, and pump; trial here; £20; exchange push bike and cash; write, or call after 2 Saturday.—6, Avenue Rd., Shepherd's Bush. [7471

6 h.p. Bradbury Combination, 1914¾, engineer owned, 3-speed countershaft, new rings, hand-foot clutch, spring pillion, Cowey, lamps, horn, tyres good; any trial here; £65.—McCulloch, Parr Cottage, St. Helens. [X4917

B.S.A.

B.S.A., 1917 models H and K, with sidecars, in stock.—Moss, Wem. [X5060

1912 3½h.p. B.S.A., 2-speed, free, perfect; £25.—248, Bentley Rd., Doncaster. [X5114

COLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

1913 B.S.A., 3½h.p., clutch model; £22; splendid condition.—40, Lower Rd., Erith. [7559

NEW B.S.A., chain drive, in stock; exchanges quoted; £66.—Motor Exchange, Horton St., Halifax. [7647

1915 4¼h.p. B.S.A., semi T.T., clutch model, in good trim; £32/10.—Jones, Garage, Broadway, Muswell Hill. [7693

B.S.A., 1913, 2-speed, clutch, lamps, speedometer, splendid condition; £30.—Carr, 35, Arlington Rd., London, N.W. [7569

B.S.A., 1916, 4¼h.p., 3-speed countershaft, coach sidecar, ridden 400 miles; 60 gns.—29, St. Leonard's St., Bow. [7585

B.S.A., chain-cum-belt, 1917 model, nearly new, complete with lamps, etc.; £60 cash.—Sharman, Market Place, Brackley. [X5089

B.S.A., 1916, all chain, overhauled, all accessories; £55; extended payments arranged.—Service Co., 292, High Holborn, London. [X4966

1914½ 4¼h.p. Chain-driven B.S.A., 3 speeds, kick starter, excellent condition; 45 gns., or exchange.—30, Talbot St., Burnley. [X5104

B.S.A., 1916, 4¼h.p., chain-cum-belt, almost new, full accessories; owner wounded, unable to ride; £55 or offers.—Paton, 19, Belgrave Sq., S.W. [X4920

B.S.A., late 1915, chain drive, 3-speed, and coachbuilt sidecar, perfect condition, new Dunlops throughout; £55.—89, St. John's Rd., Wembley. [7515

B.S.A., July, 1915, 4¼h.p., and Millford sidecar, mileage 5,200, complete, and spares, insured to July; £70.—Kolok, Tariff Rd., Tottenham. [7526

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert J. Pitts, Redditch. Tel.: 91 [X0529

1913 B.S.A. 2-speed, two in stock, belt drive, also one chain drive, £30 each; deferred payments arranged.—Jones, Garage, Broadway, Muswell Hill. [7700

B.S.A. Model K, 1915, 4¼h.p., 3-speed, complete with Campion coachbuilt sidecar (practically new); officer going abroad; £50.—Staff Sergeant Clarke, 38, Mason St., Liverpool. [X4877

1917 B.S.A.'s, all models from absolute stock; cash deferred, or exchanges, Douglases preferred.—Jones, Garage, Broadway, Muswell Hill. 'Phone: Hornsey 2562. [7702

1916 B.S.A., chain drive, 3-speed countershaft gear, and Phœnix coachbuilt sidecar, under 2,000 miles, accessories; £63, or near.—136, Ancona Rd., Plumstead, S.E. [7627

1915 B.S.A., 4¼h.p., 3-speed, clutch, kick start, with smart coachbuilt sidecar and the usual accessories; £55· exchanges.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [7554

1917 B.S.A.'s, models H and K absolutely in stock; also 1914 4 months' old model K. with No. 1 B.S.A. sidecar, all lamps, etc., a rare bargain, £67/10; deferred payments, exchanges.—Jones, Garage, Broadway, Muswell Hill. [7701

TWO B.S.A. 1915 Models, 3-speed countershaft gear, kick start and free engine clutch, fitted with all accessories and ready for the road; 50 gns. each, guaranteed.—Wauchope's, B.S.A. City Agents, 9, Shoe Lane, Fleet St., London. [7579

B.S.A., 4¼h.p., Oct., 1915, countershaft 3-speed gear and kick starter, free engine, semi T.T. handlebars, mileage under 2,500, fitted with coachbuilt Canoelet sidecar, complete with 2 head lamps, etc., all accessories and spares, sporting outfit; £57; owner going abroad.—Box 661, c/o *The Motor Cycle*. [X4923

B.S.A. latest new models can be delivered from stock; chain drive model H, 3-speed countershaft gear, £66; chain-cum-belt model K, £64; Montgomery sidecars in stock to fit from 10 gns.; your present machine can be taken as part payment.—Elce and Co., B.S.A. Agents, 15-16, Bishopsgate Av., Camomile St., E.C. [0551

B.S.A.'s, both 1917 models actually in stock; deferred payments, exchanges; good prices paid for good second-hand up-to-date machines in part exchange; also in stock, 1916 model H and Swan sidecar, all accessories, condition A1, £68/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. 'Phones: Walthamstow 169, and Hornsey 1956. [7503

MAUDES MOTOR MART

SECOND-HAND BARGAINS

SIDECAR OUTFITS.

TRIUMPH, 3½ h.p., 2-speed countershaft, Sidecar ... £32
INDIAN, 1913, 7 h.p., coach-built Sidecar, 2-speed *£39
ZENITH, 1914, 6 h.p., countershaft clutch model £60
RUDGE, 1913, 5-6 h.p. Multi, with Rudge Sidecar £46
ENFIELD, 1912, 6 h.p., 2-speed, twin, Enfield Sidecar £29
RUDGE, 1913, 3½ h.p. Multi, coach-built Sidecar *£33
SCOTT, 1914, 3½ h.p., 2-sp., and Scott sidecar chassis £47
ZENITH, 1915, 3½ h.p., twin, clutch, and C.B. Sidecar £49
P. & M., 3½ h.p.. 1913, 2-speed, C.B. Sidecar *£46
JAMES, 4½ h.p.. 1914, 3-speed, Empress Sidecar *£55
HARLEY-DAVIDSON, 1916, 7-9 h.p.,Bramble Sidecar.*£84
SUNBEAM, 1915, 3½ h.p. Combination *£78
SUNBEAM, 1916, 3½ h.p. Combination £82

LIGHT CARS.

G.W.K., 1914, 8 h.p., just re-painted and overhauled £120
G.W.K., 1915, 8 h.p., just re-painted, detach. wheels*£165
KNIGHT Junior, 1914, 11.9 h.p., sporting body *£145
SINGER, 1913, 10 h.p., 5 lamps, just being overhauled.*£135
SINGER, 1913 (late), 5 lamps, dickey *£140
HILLMAN, 1915, 9.5 h.p., speedometer, little used.*£205
MATHIS, 1914, 15 h.p., 5-seater, dynamo *£325
DAIMLER 38 h.p. ¾ Landaulette, C.A.V set.....*——
SWIFT, 1915, 10 h.p., dynamo, like new.....*£250
BELSIZE, 1912, 10-12 n.p., dynamo, being re-painted.*£170
MAXWELL, 1911, 18 h.p., 4-seater, hood and screen. *£40
FORD, 1913, 20 h.p., 5-seater, windscreen £60
MORGAN, 1913, 8 h.p., hood and screen..... *£60

SOLO MOUNTS.

DOUGLAS, 1915, 2¾ h.p., 3-speed, like new.....*£54
DOUGLAS, 1915, 2¾ h.p., 2-speed, model V..... £43
DOUGLAS, 1914, 2¾ h.p., 2-speed *£45
DOUGLAS, W. O., 1915, 2¾ h.p., 2-speed £47
DOUGLAS, 1914, 2¾ h.p., 2-speed, and kick-start ..*£46
DOUGLAS, 1914, 2¾ h.p., 2-speed, Lucas horn *£47
TRIUMPH, 1912, 3½ h.p., clutch model, Bosch *£28
TRIUMPH, 1914, 4 h.p., 3-speed, Bosch.....*£48
TRIUMPH, 1912, 3½ h.p., Standard touring *£26
TRIUMPH 1913, 3½ h.p., 3 speed all accessories ...*£32
TRIUMPH, 1914, 4 h.p., 3-speed (late date) *£48
TRIUMPH, 1909, 3½ h.p., delivered 12.12.08 ..... £19
TRIUMPH, 1914, 4 h.p., 3-speed, electric horn *£41
INDIAN, 1914, 7-9 h.p., clutch model, speedometer .*£41
INDIAN, 1915, 5 h.p., 3-speed, excellent condition ..*£48
INDIAN, 1914, 7-9 h.p., 2-speed, spring frame *£44
INDIAN, 1914, 7-9 h.p., T.T. model, very fast *£41
B.S.A., 1914, 4 h.p., 3-speed, all chain *£41
B.S.A., 1916, 4¼ h.p., 3-speed, mod. K., speedometer*£50
ENFIELD, 1911, 2¾ h.p. twin, 2-speed, chain drive..*£20
ENFIELD, 1911, 2¾ h.p. twin, Grado gear *£14
HUMBER, 1914, 2¾ h.p. twin, light touring machine*£17
HUMBER, 1914, 3½ h.p. 3-speed, water-cooled *£38
CALTHORPE, 1914 (late), 2½ h.p., 2-sp., 2-str. *£22
NEW HUDSON, 3½ h.p., 3-speed, only done 1,000 miles.*£30
IVY, 1915, 2½ h.p., 2-stroke, Senspray carburetter £16
RUDGE Multi, 1913, 3½ h.p. Sensprav, very fast £33
REX, 1914, 4 h.p., 2-speed, and handle start £28
PREMIER, 1913, 2½ h.p. single-cyl., fine lightweight .. £14
F.N., 1912, 2½ h.p., 2-speed, shaft drive £17
RADCO, 1916, 2 h.p., single-speed, almost new £20

Machines starred (*) are complete with lamps, horn, etc.

1914 and 1915 DOUGLAS MACHINES bought for Spot Cash

NEW 1917 MODELS.

ROYAL ENFIELD, 3 h.p., twin, 2-speed £57 15
ROYAL ENFIELD, 2¾ h.p., 2-speed, 2-stroke £44 2
B.S.A., 4½ h.p., 3-speed, all-chain, H, 1917 model . £66 0
B.S.A., 4½ h.p., 3-speed, belt, K, 1917 model £64 0
B.S.A., 3½ h.p., Model D, T.T. £52 10
ROVER, 1917, 3½ h.p., 3-speed, solo £69 13
ROVER, 1917, 3½ h.p., T.T., Philipson pulley ... £61 10
LEVIS, 2½ h.p., single-speed, Popular model (1916) £32 0
COVENTRY EAGLE, 2-stroke, de luxe (1916).... £37 15
ZENITH, 8 h.p., clutch and countershaft £85 10

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MOTOR CYCLES FOR SALE.

Calthorpe

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799

1917 2¾h.p. Calthorpe-Jap, 2 speeds, and free engine, brand new; 38 gns.—30, Talbot St., Burnley. [X5103

CALTHORPE, 1915, 2-stroke, new condition throughout; £22.—P. J. Evans, John Bright St., Birmingham. [7679

CALTHORPE-J.A.P., 1915, 2¾h.p., Enfield 2-speed; owner on service; bargain, £18.—54, Hatherley Rd., Sidcup. [7615

1914 Calthorpe-Precision, 2-speed, thorough running order, little used; £14.—Hilder, 15, Reginald Rd., Bexhill. [X4694

CALTHORPE Junior, 1914; £15.—Tuke and Bell, Ltd., Motor Dept., Carlton Engineering Works, High Rd., Tottenham, N. [7457

2¾h.p. Calthorpe-Jap, 1915, only used one month, property of officer, perfect order; £22/10.—Ray, 10, Elms Buildings, Eastbourne. [7611

1915 Calthorpe 2-stroke, countershaft 2-speed, F.E., lamps, horn, footboards; bargain, £19; exchanges.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [7555

CALTHORPE-J.A.P., 1916, 2-speed, Palmer cords, ridden 600 miles, economical; exchange 4h.p. Douglas.—Renyard, 9, Abbey Rd., Enfield, Middlesex. [7568

P. J. EVANS, Controlling Birmingham Agent.—All 1917 Calthorpe models in stock, including 4-5h.p. combinations, lightweights, 2-stroke and 4-stroke.—Write for catalogue, 87-91, John Bright St. [X5042

CALTHORPE.—P. J. Evans, Controlling Agent for Birmingham District.—1917 models in stock for immediate delivery: Combinations, 2¾h.p., 2-speed models, also 2-strokes; write for list.—P. J. Evans, John Bright St., Birmingham. [7687

CALTHORPE-J.A.P.'s, 2-speed models in stock, 38 gns.; deferred terms if desired; also a 1916 2-speed J.A.P. model, with mirror, horn, cyclometer, special engine; £35/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169, and Hornsey 1956. [7498

Campion.

4h.p. 1915 Campion Motor Cycle, new condition, done about 700 miles; £32.—W. J. Glenn, Ayston Rd., Uppingham. [X5121

CAMPION-J.A.P., Oct., 1916, 4h.p., 3-speed Sturmey-Archer, only done 600 miles; owner nervous; lamps, tools, and Stewart speedometer; cost £75, sacrifice at £60.—Gurney, 93, Westgate, Grantham. [X5093

Chater-Fafnir.

CHATER-FAFNIR, 3½h.p., Grado gear, splendid condition; £25, or exchange for good lightweight.—Bryan, Grosmont, near Hereford. [X5144

Chater-Lea.

CHATER, 2-stroke, 4h.p., 2-speed, overhauled; £18/10; extended payments arranged.—Service Co., 292, High Holborn, London. [X4988

Chater-Lea-Precision.

1916 3½h.p. Precision Engine, Chater-Lea frame, T.T. model, very sporty and brand new, never been ridden; a real good, cheap lot, £27/10; first viewer will purchase.—Jones, Garage, Broadway, Muswell Hill. [7703

Clyno.

CLYNO 1912 6h.p. Combination; £35/10.—Motor Exchange, Horton St., Halifax. [7648

CLYNO, 1915, 2½h.p., mag., disc wheels, beauty; £25/10.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [7520

CLYNO Combination, 6h.p., speedometer, spares, all accessories; £50; thoroughly overhauled at cost of £18.—68, St. Stephen's Rd., Hounslow. [7465

CLYNO, 1914, No. 6 sidecar, recently overhauled, guaranteed; £65; extended payments arranged.—Service Co., 292, High Holborn, London. [X4989

CLYNO, 5-6h.p., 2-speed, coach sidecar, speedometer, lamps, horn, and spares; bargain, £48.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [7190

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

CLYNO (Sept., 1914) Combination, fully equipped, in grand condition throughout, extra C.B. body for trade use, easily changed; nearest £60.—Pollard, Wragby, Lincoln. [X4909

CLYNO, 1914, 6h.p., 3 speeds, double-seated Millford sidecar, lamps, horn, speedometer, accessories, splendid condition; must sell; accept £62/10.—E., 208, Camberwell Rd., S.E. [7614

Connaught.

CONNAUGHT, 3-speed, free engine, clutch model, wicker sidecar, as new; any trial; or part exchange Ford car.—7, Wyle Cop, Shrewsbury. [7621

CONNAUGHTS.—1917 models in stock. I can give immediate delivery from stock of the well-known 2-stroke, prices from 28 gns.; shop-soiled model, £27.—P. J. Evans, John Bright St., Birmingham. [7686

MOTOR CYCLES FOR SALE.

Connaught.

BIRMINGHAM Agent, P. J. Evans, John Bright St.—1917 models of the famous Connaught 2-stroke, standard 2¾-3h.p. models, either solo or with sidecar; miniature models, single or 2-speed countershaft gear; prices from 27 gns. [X5040

Coventry Eagle.

COVENTRY Eagle, 1916, 6h.p., 3-speed countershaft, coach sidecar, and accessories; cost £100, little used, £69/10.—Motor Exchange, Horton St., Halifax [7649

Crescent.

CRESCENT, 1916, 2½h.p., 2-speed, 2-stroke, £9 worth accessories, including speedometer, Stewart warner; cost £46, nearest £30.—Details, Fowler, Brooks' Garage, 15, Llanover Rd., Plumstead. [X4906

Douglas.

1911 Douglas, exceptional condition; £17.—248, Bentley Rd., Doncaster. [X5112

DOUGLAS, 1912, clutch, 2-speed, kick start, little used.—5, Chatsworth St., Derby. (D) [X455?

IF You Want a Douglas, visit or write The Walbro Garage, Ely. We have them. See below.

1915 Douglas, 2¾h.p., 3-speed, Lucas head and rear lamps, absolutely as new, ridden about 200 miles only; £48.—Below.

1915 Douglas, 2¾h.p., 2-speed, P. and H. lamp, Lucas rear, Lucas horn, footboards, and metal leg shields, spare tank for running on substitute; £44.—Below.

1915 Douglas, 2¾h.p., 2-speed, P. and H. lamp, Lucas rear and Lucas horn, Stewart speedometer special large plated exhaust pipes, tyres almost new, very fast; £47.—Below.

1914 Douglas, 2¾h.p., 2-speed, T.T., all in splendid condition, lamps, horn, etc.; £32.—Below.

THE Walbro Garage, Ely, Cambs. 'Phone: 48. [X4978

DOUGLAS, late 1914, clutch model, various spares; £35.—Hunter, Darlington Rd., Ferryhill. [X494?

1910 Douglas, single speed, as new; exchange or sell £19.—Singleton, 15, Enmore Rd., South Norwood. [X501?

DOUGLAS, 1913, 2 speeds; £30.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [7639

1912 Douglas, 2 speeds, footboards, complete [illegible] horn, numbers; £22.—Cross, Jeweller, Rotherham. [X5070

1913¾ Douglas, 4,000 rev. engine, very fast, climbs 1 in 2½; £30.—Meeson, 35, Park St., Islington, London. [7595

1914 Douglas 2-speed, lamp, horn, etc., tyres as new, splendid engine, fast; £39.—Gibb, Gloucester. (D) [X5049

DOUGLAS, 2¾h.p., £15/10; 1913 2-speed, £34/10; 1914 2-speeds, £39/10.—Motor Exchange, Horton St., Halifax. [7650

DOUGLAS, 1914, T.T., 2¾h.p., good tyres, in good condition throughout; £35.—John Chaplin, Fulbourn, Cambs. [7482

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Yeovil Tel.: 50. [585

1913 Douglas, 2¾h.p., 2-speed, T.T. model, in fine trim, lamps, etc.; £29.—Jones, Garage, Broadway, Muswell Hill. [7694

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

DOUGLAS, 2¾h.p., fine order, new tyres, plating enamelling new, only wants seeing; £17.—14, Doubrooke Rd., West Norwood. [0869

DOUGLAS, 1915, 4h.p., coach combination, faultless condition; £60; part exchange entertained.—124 Walton Rd., Hampton Court. [X5121

2¾h.p. Douglas 2-speed Model, fitted with a light side-car; the combination £30, guaranteed.—Wanchope's, 9, Shoe Lane, London. [7580

1912 Douglas and Sidecar, both good condition, fast reliable machine; rare bargain, £26.—6, Lorenzo St., Pentonville Rd., King's Cross. [7643

DOUGLAS, 1915, 2¾h.p., T.T., overhauled and re enamelled; £44; extended payments arranged.—Service Co., 292, High Holborn, London. [X4990

1915 2¾h.p. T.T. 2-speed Douglas and accessories in good condition; £42/10; seen any time.—Bonnde' Garage, 223, High Rd., Kilburn. [7472

DOUGLAS Specialists.—Gibb, Gough, London Rd Gloucester. Gibb, the International Douglas rider wioner of numerous cups and gold medals. [2216

DOUGLAS, 1914, 2¾h.p., 2-speed, T.T. bars, lamps and horn, fast, and reliable, good condition; £32 or nearest offer.—97, Malvern Rd., West Kilburn. [7435

1915 Douglas, 2¾h.p., 2-speed, Lucas acetylene lamp front and rear, speedometer, etc.; £37/10, no offers; private owner.—5, Raw Lane, Illingworth, Halifax, Yorks. [X5007

DOUGLAS, 1915, 3-speed, Colonial model, perfect condition, all accessories, mechanical horn, tyres almost new; seen any time; £40, no offers.—Terry, jun., Odiham, Hants. [X4945

NEW MODELS FROM STOCK.

ALLON, 2-stroke, 2-speed	£42	0
B.S.A., 4½ h.p., 3-speed, chain drive	£66	0
B.S.A., 4½ h.p., 3-speed, model K	£64	0
BROUGH, 3½ h.p., T.T. model, 2-speed	60 gns.	
CALTHORPE, 2-stroke, 2-speed	33 gns.	
CALTHORPE-J.A.P., 2¾ h.p., 2-speed	38 gns.	
ENFIELD, 2-stroke, 2-speed	42 gns.	
ENFIELD, 3 h.p., twin, 2-speed	88 gns.	
ENFIELD, 6 h.p., Combination	90 gns.	
ENFIELD, 6 h.p.. Combination, with Lucas dynamo lighting set	105 gns.	
JAMES, 2-stroke, 2-speed	£42	0
JAMES, 3½ h.p., twin, 3-speed	£69	0
JAMES, 4½ h.p., Combination	£88	0
NEW IMPERIAL, 2½ h.p., 2-speed	39 gns.	
NEW IMPERIAL, 2½ h.p., 2-sp., clutch and kick-starter	46 gns.	
ZENITH-GRADUA, 3½ h.p., twin	£62	0

EXCHANGES

We specialise in exchange transactions, and will allow full value for your old Motor Cycle or Light Car in Part Payment for any new one

SECOND-HANDS.

The following is a selection from our large stock of machines of all types:

CLYNO, 1914, 6 h.p. Combination, Lucas electric lighting set, speedometer	£68	0
JAMES, 1915, 2½ h.p., 2-stroke, 2-speed, Lucas lamp set, rear lamp and horn	£33	0
ALLON, 1915, 2¾ h.p., 2-stroke, 2-speed	£33	0
MATCHLESS, 1913, 8 h.p., 2-speed, clutch, & kick-starter, all accessories	£38	0
ZENITH, 1913, 3½ h.p., Gradua gear	£30	0
PREMIER, 1915, 3½ h.p., countershaft, 3-speed gear, lamps, and horn	£45	0
CALTHORPE, 1915, 2¾ h.p., 2-stroke, 2-speed, headlight, rear lamp, horn, and speedometer	£28	0
VINDEC, 1911, 5 h.p., 2-speed, headlight, rear lamp, horn and coachbuilt Sidecar	£22	0
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DOUGLAS 1915 2¾ h.p. War Office model	£50	0
ALLDAYS MATCHLESS, 1915, 3½ h.p., coach-built Combination, 3-speed, lamps and horn	£45	0
TRIUMPH, 1914, 4 h.p., 3-speed	£40	0
JAMES, 1916, 2¾ h.p., 2-stroke, 2-speed, lamps, and horn	£36	0
B.S.A., 1916, 4½ h.p., 3-speed, all-chain drive, lamps, horn, and Canoelet Sidecar	£63	0
ROYAL ENFIELD, 1914, 3 h.p., twin, 2-speed	£32	0
DOUGLAS, 1910, 2¾ h.p., lamps and horn	£15	0
CALTHORPE-MINOR, 1914, 2 h.p., 2-sp., and free engine	£15	0
CALTHORPE-J.A.P., 1915, 2¾ h.p., 2-sp., lamps and horn	£30	0
BROUGH, 1916, 3½ h.p., T.T., 2-speed, headlights, rear lamp, speedometer	£53	0
NEW IMPERIAL-J.A.P., 2½ h.p., T.T. model, 2-speed, Cowey speedometer	£33	

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MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS, 2¾h.p. T.T., late 1913, 4,000, perfect, very fast, climb anything normal on top; trial; deposit; owner in army 18 months; £33.—Newman, Cowpen Hall, Blyth. [7512

LATE 1914 Model V Douglas, not ridden till 1915, in excellent condition throughout, complete with Lucas lamps and horn, full kit of tools, etc.; £38.—Lewis, 65, Shakespeare Av., Bath. [7644

1913-14 2¾h.p. Douglas, clutch, lamp, new tyres, Stewart horn, special engine and carburetter, just overhauled; bargain, 33 gns.; guaranteed.—Curtis, St. Cuthberts, Norwich Rd., Thetford. [X4961

DOUGLAS, 1914, 2¾h.p., T.T., machine little used, in excellent condition, 2 Lucas lighting sets, horn, spare belt, knee-grips, etc., tank red and black; £38.—Gosse, Ferns, Southend Av., Darlington. [X4705

RIDER TROWARD'S, 78, High St., Hampstead.—1912-13 T.T. Douglas, 2-speed, perfect, 24 gns.; 1913 Douglas, new 1914, 2-speed, clutch, kick start, thoroughly overhauled, new tyres, fast, 32 gns. [7541

DOUGLAS, 2¾h.p., nearly new, W.D. model, complete with lamps, horn and tools; £57/10; easy purchase terms if desired; exchanges entertained.—Harrods, Ltd., Motor Cycle Dept., Basil St., Brompton Rd., London, S.W. [7462

Enfield.

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

ENFIELD, 1916, 6h.p., and sidecar, as new, guaranteed; £78/10; extended payments arranged.—Below.

ENFIELD, 3h.p., done 120 miles only, unscratched, speedometer; £52/10; extended payments arranged.—Service Co., 292, High Holborn, London. [X4992

ENFIELD 1916 6h.p. Combination, little used, guaranteed perfect, with accessories; £75.—Moss, Wem [X5059

ENFIELD 3h.p. Twin, 2-speed, free, pedal start, good order, fast; £20.—14, Dodbrooke Rd., West Norwood. [0878

1917 6h.p. Enfield Combination and accessories, as new; £85; seen any time.—Bounds' Garage, 223, High Rd., Kilburn. [7480

ENFIELD, 8h.p., 1914, sidecar, and 3 lamps, speedometer; £55; good condition.—Collyer, 286, High Rd., Wood Green, N. [X5122

ENFIELD 1912 6h.p. Combination, good condition, fast, absolutely reliable; £35.—The Cottage, King's Head Hill, Chingford. [7533

ENFIELD 1916 6h.p. Combination; a bargain, £69/17/6.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [7491

3h.p. Twin Enfield, Bosch, B. and B., good tyres, needs little attention; first £20 secures.—Gunning, H.M.S. Star, c/o G.P.O. [7452

6h.p. Royal Enfield 1913 Combination, in very fine order; £45.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [7637

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock for immediate delivery.—See below.

1917 6h.p. Enfield Coachbuilt Combination, with apron and mat, 2 speeds, clutch and starter, 90 gns.; extra for hood and screen, £4/19; Lucas lighting set, 15 gns.; 8h.p. engine, £2 extra.—Below.

1917 3h.p. Enfield, solo or sidecar mount, 2 speeds, clutch, and kick starter; 55 gns.; sidecars from 7 gns.—Below.

1917 Enfield 2-stroke, 2¼h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright St., Birmingham. [X5038

1913 3h.p. Royal Enfield, 2-speed, kick starter, lamps, horn, tools, etc., good tyres and condition; £27.—Turner, Westbourne House, Twickenham. [7447

1914 Enfield Combination, speedometer, horn, Major F.R.S. set, sidecar and tail lamps, recently overhauled; £55.—Scott, High St., Westerham, Kent. [7518

1916 Enfield, 6h.p., sidecar, 2-speed, competition machine, guaranteed 60 m.p.h.; 63 gns.; very sporting.—245, Hammersmith Rd., London, W. [7509

1916 Enfield Combination, very little used, £82/10; also 1913-14 Enfield coachbuilt combination, £57/10.—Collier's Motories, Deal St., Halifax. [7652

1915¾ 6h.p. Enfield Combination, speedometer, horn, lamps, only run 1,500 miles.—Best offer to Walters, Grasmere, Eversley Rd., Sketty, Swansea. [7181

ENFIELD Combination, 1916, 6h.p., 2-speed, with lamps, horn, etc., splendid condition; £78.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0491

ENFIELDS.—Birmingham Controlling Agent, P. J. Evans, for immediate delivery all models: Combinations and Solo mounts.—87-91, John Bright St. [7688

1915¾ Enfield 3h.p. Twin, kick starter, overhauled, not ridden past six months, good lamps, no generator; £25; seen by appointment.—Surveyor, Oakdene, Rottingdean. [X4699

ENFIELD Combination, 90 gns.; 3h.p. twin, £57/10; 2-speed, 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

ENFIELD 1913 Combination, less body, 6h.p. twin, Bosch, 2 speeds (countershaft), speedometer; great sacrifice, 29 gns.; exchanges.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [7521

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SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

Who should hold Driving Licences?

THE action of the Northamptonshire Licences Committee in making a representation to the Home Office and Local Government Board urging that it should be made impossible to grant driving licences to obviously incompetent persons, such as those suffering from blindness, *deafness*, etc., has brought strong protests from motor cyclist readers. Whilst the committee are undoubtedly right in recommending that some discrimination should be made in granting licences to blind and limbless people, they are surely over-stepping the mark when they specifically include those who suffer from deafness. Many successful motorists of the present day are deaf, but no real danger to other road users has been proved on account of that affliction.

One of our correspondents, "SW149," points out a glaring inconsistency in this matter, viz., that whereas efforts are, on the one hand, being made to provide motor vehicles for men incapacitated in the war by arranging the controls suitably for men who have lost an arm or a leg, on the other we have an authority (?) actually urging that licences be withheld from people who are deaf. Personally, we do not see how a deaf man can be a danger to others if he drives carefully—and all who do not drive carefully are a danger whether deaf or not—and there can be no possible reason for refusing him a licence. A man does not steer by ear or avoid a collision because he hears another vehicle. It is bad policy to trust to the ear at a blind corner or dangerous cross roads, for even a man whose hearing is acute may fail to detect the sound of an approaching vehicle for a variety of reasons. A deaf man may occasion some delay to those who are overtaking him on a narrow road, but this difficulty can easily be removed by the use of a mirror on the handle-bar, and it cannot be said that deaf people are the only sinners in this respect.

Will New Motor Cycles be Cheap after the War?

OF all the absorbing problems which confront the motor manufacturer to-day, none is more engrossing than the question of prices after the war. It is not remarkable, perhaps, that there are conflicting views, one school being of opinion that it will take years before the prices of raw materials descend to their pre-war level, as well as normal cost of living, which factors alone will prevent any sudden decline in the price of new motor cycles as compared with those existing at the outbreak of war. The other school—and it is a strong and representative body—can see nothing but quantity production with the most modern labour-saving devices on the most advanced system, which they contend must inevitably lead to an all-round cheapening of manufacture with a corresponding reduction in selling price. But even this section does not anticipate any drastic reduction in the selling price of the highest class machines at any rate.

We have reminded our readers on previous occasions that the lavish equipment of munition works with the latest types of machine tools—many admittedly unsuitable for motor work—and the many new engineering factories erected since war broke out which will be seeking a new channel for their energies when this dreadful war ceases, must have their effect upon the question under discussion. The lightweight—particularly the two-stroke—offers the best possibilities for cheap and rapid production, and we feel that we shall not be far wide of the mark when we suggest that £20 lightweight motor cycles produced on a quantity basis will be no novelty when peace returns. The lightweight is an excellent stepping stone to the more ambitious and completely equipped motor cycle, so that the advent of the low-priced lightweight should not meet with disfavour from sections not interested in it from a manufacturing point of view.

An index to the advertisements in this issue will be found on the page facing the back cover.

A HOME-MADE KICK-STARTER.

How a Reader fitted his 3½ h.p. Zenith with a Foot-starter for Use with a Sidecar.

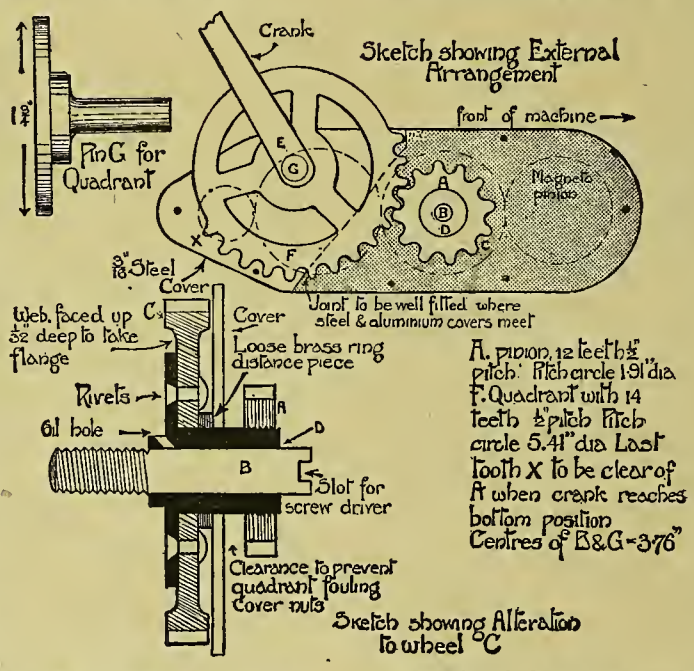
ALTERATIONS and improvements which can be carried out by motor cyclists themselves in their spare time always seem to me to be of more than usual benefit to the general rider, and incidentally in *The Motor Cycle* dated January 18th a correspondent raises the question as to the possibility of fitting a kick-starter to a 6 h.p. Zenith.

As I have recently carried out such an alteration to a 3½ h.p. machine of this make, which I purchased second-hand, it may be of interest to other Zenith riders if I give a brief description and rough sketches showing how it was done.

The only suitable place I could find was on the timing gear side, between the front and back footrests.

My magneto is gear driven, so I removed the intermediate wheel next to the magneto, and also the pin carrying it. One revolution of this wheel equals two and a quarter engine revolutions.

The alterations to this wheel were as follow. A 1in. hole was bored through the centre of the wheel C, and in this was placed a bush D, which was turned with a thin flange, and on the back of it a small boss was left to replace the original boss on the wheel, which disappeared in the boring process. The flange was then riveted to the web of the wheel, the rivets at the back being countersunk and finished off flush with the flange.


Sketch showing External Arrangement
Crank
front of machine
Pin G for Quadrant
Magneto pinion
⅜" Steel Cover
Joint to be well filled where steel & aluminium covers meet
Web faced up C to ½ deep to take flange
Cover
Loose brass ring distance piece
Rivets
Oil hole
Slot for screw driver
Clearance to prevent quadrant fouling Cover nuts
A. pinion, 12 teeth ½" pitch. Pitch circle 1.91" dia
F. Quadrant with 14 teeth ½" pitch Pitch circle 5.41" dia Last tooth X to be clear of A when crank reaches bottom position Centres of B&G=3.76"
Sketch showing Alteration to wheel C

The pin B was next made and fitted in the timing case to replace the short pin removed. This should be an easy fit in the bush D, and should be case-hardened to prevent seizing. The oil holes in the bush D and a large groove were necessary, owing to length of bearing surface.

A pinion A having twelve teeth ½in. pitch was next tapped 1in. thread to screw on to the bush D.

The aluminium timing gear cover was next cut as shown in the sketch of the external arrangement, and a steel plate, cut to shape as shown, was carefully fitted—special care being taken to make a good joint to prevent loss of oil from gear case. The steel plate was necessary to withdraw the weight on the pedal.

A hole 1 1/16in. diameter was next carefully cut in the aluminium half of the cover to allow the bush D to revolve without touching the cover. A brass distance piece, sufficiently thick to prevent the teeth of the wheel C touching the cover, was slipped on to D. This completed the actual alteration to machine.

An old pedal crank and chain wheel were next taken in hand. The chain teeth rim was removed from the three arms, and a piece of steel plate ⅜in. thick was cut to the shape shown and fitted to the arms. Fourteen teeth were cut and filed up to shape, the rest of the periphery being reduced to clear the wheel A. I find these fourteen teeth driving on to the twelve of the wheel A give about two and a half revolutions of the engine; and the position of the crank shown in the sketch is the best position for starting the kick. In place of the pedal I have a roller 4½in. long on a ¾in. pin. A flanged pin G to suit the hole in the crank completes the necessary parts.

The Assembling Process.

The pin B having been put in place, and the lock nut securely tightened up, the wheel C is put in its place (making sure first that the magneto timing is correct). The aluminium half cover is placed in position, care being taken that the brass distance piece is just free when the cover is pressed home to the timing gear casing. The wheel A is now screwed on to the projecting bush D. Place the steel cover on its four studs temporarily to mark off position of the flanged pin G. The top of this flange should come up to the top of the steel cover, so that the crank clears the ground. By holding the quadrant F in gear with A the exact centre for G can be marked on the steel cover. G is then attached by six ¼in. cheese-headed screws to the steel plate, the ends of the screws being filed off flush.

The steel cover can now be put in place and secured with the four nuts. (In my machine it was necessary to file a bit of flange G away to clear left-hand top nut,) This completes the job, and results have justified the time spent on it.

To start up I slide the quadrant on to the pin G, in the position shown, kick down to the bottom, and draw quadrant off when engine is running, and replace it in sidecar. (I never ride solo, but in such a case a clip could be fitted to machine to carry quadrant.)

It will be seen that when the pedal is at the bottom of the stroke the last tooth of the quadrant is clear of the wheel A, so no free-wheel arrangement is necessary. It is hardly needful to say that the quadrant and also the pinion teeth should be case-hardened.

"KICKER."

Petrol Filters.

I AM a little doubtful about the wisdom of mounting petrol filters just below the petrol tap. If really substantial bases or sockets for petrol taps were firmly fixed in tank bottoms the case would be different, but in present practice the average petrol tap is so lightly mounted in the tank that it will not stand a lot of spanner work even in careful hands, and is very apt to be ripped out or loosened by the average duffer operating a large adjustable spanner rather carelessly. My own filter has just choked, and I had to work very gingerly indeed with two special spanners in order to remove it without damaging the flimsy mounting of the petrol tap.

Some Cases in Point.

SOME advertising matter to hand, describing the new Woolf graphite lubricator, tells some amazing yarns about the efficiency of graphite. It is said that in one of the big car races in America in 1916 a driver who broke his crank case sump and lost all his oil raced for several miles on the smell of oil remaining in the engine, aided by powdered graphite inserted through the sparking plug holes. Or, again, that a motor car, deprived of all its cooling water by an accident to the radiator, was driven home with graphite added to the lubricant. Or, again, that graphite is the only possible lubricant for automatic composing machines in printing shops, which melt metal to form their type. I cannot vouch for any of these yarns, and American papers print some tall stuff. Anyhow it is beyond contradiction that at least one manufacturing firm builds its hopes of dividends on the elimination of oil from many motor car bearings, including some engine bearings, for its speciality takes the form of phosphor bronze bushes, the grooves of which are filled with compressed graphite instead of being left empty for the oil to travel along them.

The Woolf Graphite Lubricator.

ANY readers who wish to form their own opinions can choose between two methods of employing graphite. They can either buy a small tin of Oildag from their accessory dealer and mix it with the oil, or they can get the Woolf lubricator (handled in this country by Jarvis Bros., Middlesbrough). It takes the form of a fair-sized screw-down greaser with a shut-off tap at the bottom, and is mounted in the inlet pipe of a car or cycle engine. Once every fifty miles the tap is opened whilst the engine is running, and sufficient graphite is inhaled to last the engine for the distance indicated. The vendors make a great point of the value of introducing the graphite at the top of the engine, but I personally question whether the device scores in any other respect than that of saving the trouble of stirring graphite into the engine oil. The patent lubricator is obviously the quickest way of getting a good supply of the stuff on the cylinder walls; but if graphite is stirred into the oil, it must reach other parts of the engine more speedily and satisfactorily; and my own experience is that the connecting rod bearings are usually the parts of a motor cycle engine where lubrication is least perfect, and—in careless hands—most precarious. It is possible that the Woolf device is selling well in America, because it meets the peculiar case of the Ford, the magneto of which would be shorted if graphite were stirred into the lubricating oil, but in any case it is a handy fitting for graphiting cylinders.

Sparking Plug Coolers.

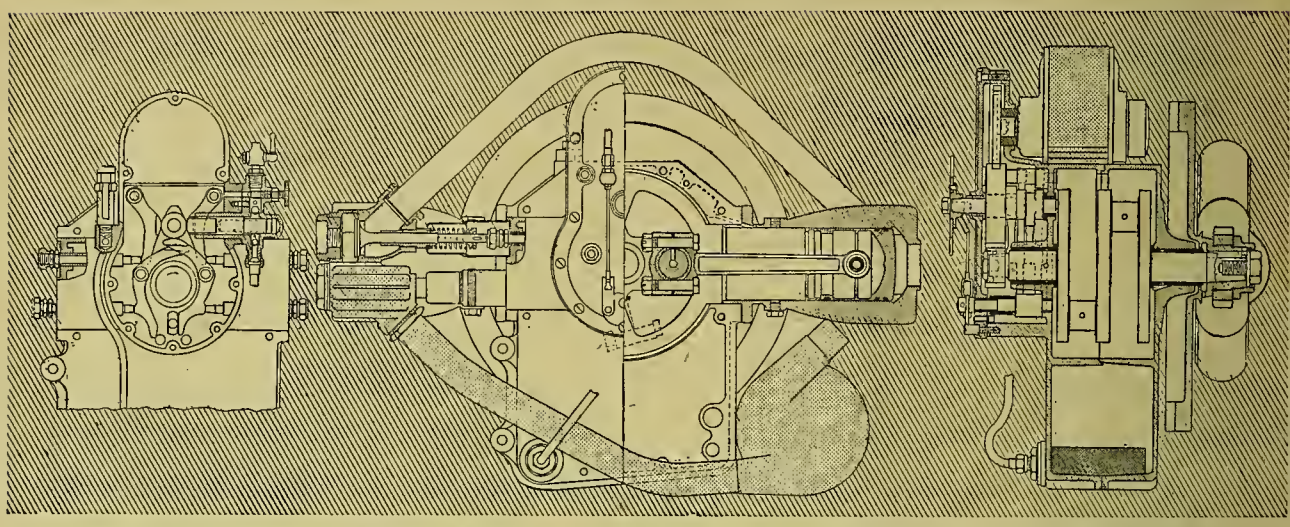
THE inventor of the Fletcher sparking plug radiators takes exception to my remarks on the unsuitability of his lower radiator for use on engines which have clearance only for a midget plug under the middle tube of the frame. As soon as materials are available in quantities, he hopes to market several styles of radiator, adaptable to any engine or any plug. It is, however, true that his sample radiator, as submitted to me, is inapplicable to engines which can only take a midget plug, and have no clearance for a tube spanner to be slipped over the plug. A King Dick can be used on a standard plug, as its hexagon barrel will protrude above the dished fins of the radiator. The Fletcher patents cover the application of detachable radiators to valve caps, compression taps, and compression release valves, as well as to sparking plugs.

Post-war Petrol Taps.

IN a recent issue I said some hard things about petrol taps, which have been a nuisance to motor cyclists for years past. They have almost always leaked, and their tapered plugs are apt to jam or seize in the seating. It was rather shortsighted of me not to realise that the immense dangers of petrol leakages on airships, aeroplanes, and motor boats were bound to lead to improvements, and I have just received a sample of a post-war tap. I must not describe it in detail for the present, but I may say that it has a flat circular seating, as large as a shilling, and faced with a special material. When tightened up so firmly that leakages are impossible, the tap opens and shuts as if it were on ball bearings. It is obviously an immense improvement on the old styles; if it has a drawback, it is that the petrol has to pass through two right-angled bends, so that any obstruction must be cleared by taking the tap to pieces, seeing that a wire cannot be pushed through it. However, if makers give us a smooth working tap which does not leak, it will be up to us to see that no dirt enters from the tank, and gauzes under the filler cap should ensure that.

THE MATCHLESS FLAT TWIN ENGINE.

Some Observations on the Mechanical Details. Aluminium Alloy Pistons Successlully Used.



MECHANICAL DETAILS OF THE MATCHLESS 5-6 h.p. FLAT TWIN ENGINE, 70 mm. × 95 mm. = 732 c.c.

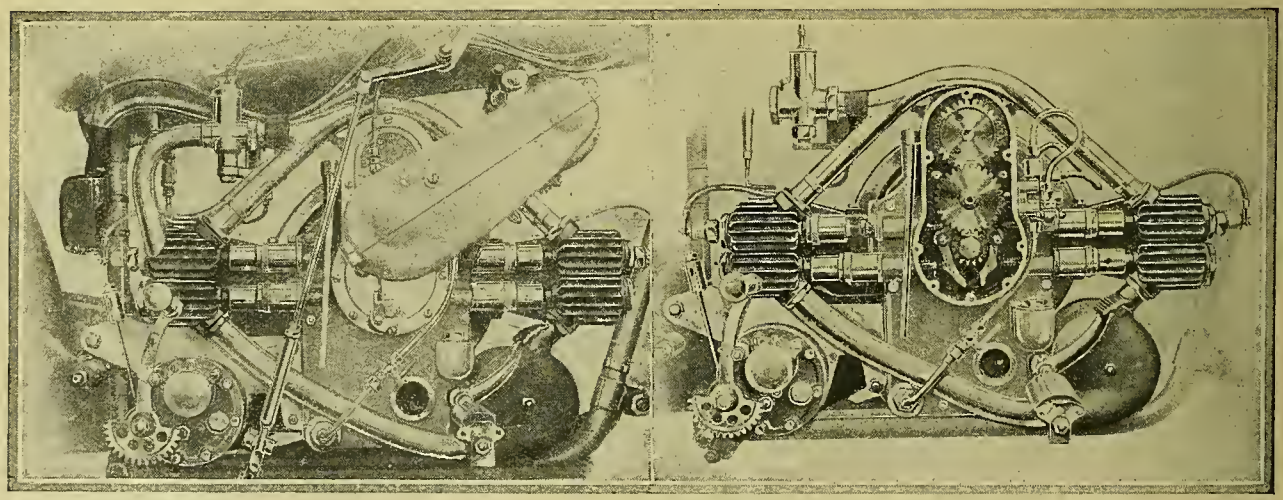
(1) Arrangement of valve gear, and cam operation of lubricating pump.

(2) Part section and side elevation of the engine.

(3) Vertical section on centre line, showing magneto drive and oil sump.

IN the issue of *The Motor Cycle* for November 16th, 1915, we published a full description of the new Matchless sidecar combination, and as the power unit is a distinct departure for this firm a few observations on the mechanical details and minor points of design will undoubtedly be of interest to our readers. The bore and stroke of this new engine are 70 × 95 mm. = 732 c.c., and the makers' rating 5-6 h.p.

One of the latest innovations is the adoption of aluminium alloy pistons, which, so far, Messrs. Collier and Sons, Ltd., have found to be most successful. These pistons are provided with two rings, and in the skirt a scraper ring is fitted, which allows increased oil pressure to be used without the accompanying disadvantage of oiled plugs. Each piston weighs only 18½ oz., including the rings, and is longer than the pistons usually employed in motor cycle practice, being 3⅜in. in length with a bore of 2¾in. This unusual length of piston is found necessary when aluminium alloy is used. There are six ribs underneath the head and an annular rib joining the two bosses taking the gudgeon pin, the object being to strengthen the piston, to radiate the heat from the piston head, and to preserve its truth by preventing distortion.



Timing gear side of the new 5-6 h.p. flat twin Matchless. Observe carburetter hot air collector, and position of dynamo and its enclosed drive.

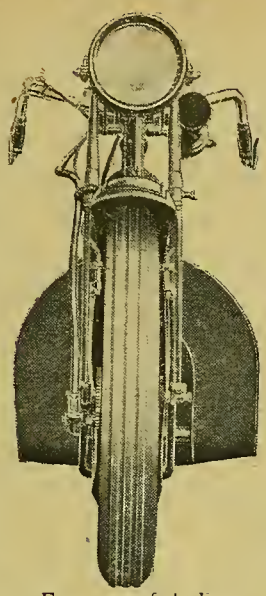
The engine with magneto drive and timing gear cover removed. The oil inspection window and also the feed pipe from the sump are discernible.

The Matchless Flat Twin Engine.

The connecting rods are somewhat short, being 7in. in length, this having been found necessary to keep the horizontal twin engine within reasonable dimensions.

The compression, though not abnormally low, is somewhat less in the case of this engine than in average touring types. All bearings are plain, as it has been found that with the forced system of lubrication ball bearings, which are usually adopted in flat twins to overcome the difficulty of lubricating, are not necessary.

The idea of fitting overhead valves was given up, as it was found that this would have involved an engine of too great a length, and the present system is more convenient. As regards the valve gear, experiments are being made with fibre timing wheels, a special kind of fibre, which is claimed to withstand both heat and oil, being employed. The valve guides of case-hardened steel are forced into the cylinders, and have the advantage of possessing excellent wearing qualities.



Front view of the latest Matchless, showing the sensible leg shields, which are extended under the engine and gear box, as shown in the lower illustration.

The Lubrication System.

To revert to the lubrication system, it was found desirable to fit a large sized pump, the surplus being returned by a by-pass, as a smaller pump, though large enough to carry out its duties effectively when the engine was warm, would not act efficiently when the oil was thick and cold. The present plunger feeds the lubricant well at all speeds. The main bush is provided with an annular groove and a passage leading direct into the flywheel boss, so that any excess of oil is carried *via* this passage to the chain case. There is a plug on the cylinder head, the same size as the valve caps, through which the engine may be decarbonised. This appears to be an excellent feature.

Provision for Cooling.

A large space is left between the cylinder and valve ports, while the longitudinal fins are excellently finished, and are a fine example of founders' work.

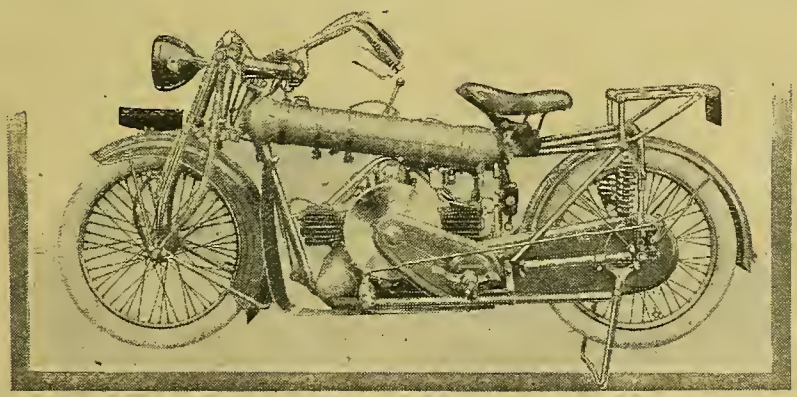
In the latter design the bosses for the compression taps have been discarded, as it has been found that the engine never gums up, and an injection of petrol is quite unnecessary. Owing to the excellently balanced flywheel and engine throughout, no transmission shock absorber is considered necessary. Messrs. Collier and Sons have found that in practice the side-by-side valve engine is smoother running than an engine fitted with overhead valves.

Valve Covers.

The accompanying drawings give a clear idea of the general construction of the unit, showing one of the valves in section, and over the other the valve spring protector, which is of telescopic pattern. A good idea of the long piston can also be obtained, as well as the shape of the radiating fins. The vertical section of the engine shows some interesting features of the lubrication system; for example, the size of the oil sump, the gauze at the base thereof through which the oil is drawn, the oilways cut in the main bearings, and the space referred to showing how the excess of oil from the right-hand bush is led into the recess on the flywheel boss, allowing the oil to leak into the chain case.

Interesting Cam Design.

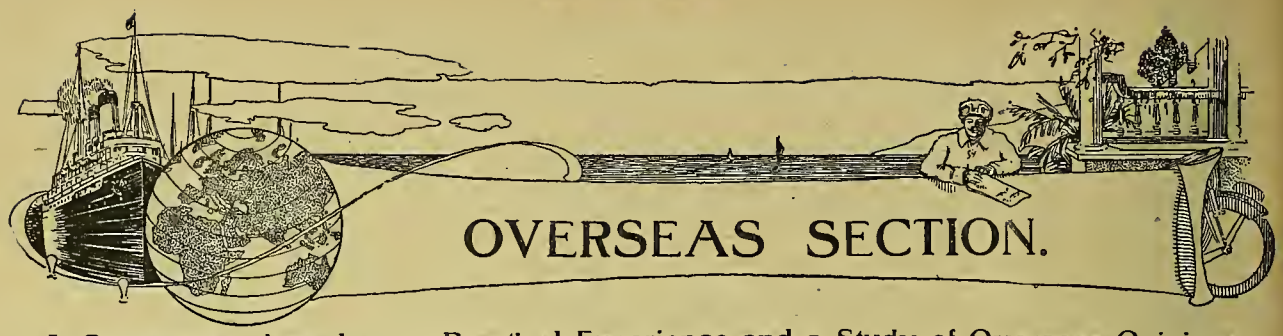
The drawing of the timing gear is also interesting, showing the single cam actuating one exhaust and two inlet valves, and the cam-actuated plunger pump, together with the by-pass. Between the two exhaust levers is a separate cam, which is employed for lifting the exhaust valves. The Matchless flat twin is certainly an engine possessing novelty and originality, and we hope, and expect, to hear a great deal more to its credit in the near future.



The newly-designed 5-6 h.p. Matchless, which has a three-speed countershaft gear box and transmission by totally enclosed chains.

Piston Ring Pressure.

A WRITER recently stated in *The Automobile Engineer* that he had investigated with a 3½ h.p. engine the pressures exerted on the cylinder walls by the piston rings. The original rings of the engine used exerted a pressure in the test of normally 11 lb. per square inch. For experiment he substituted a weaker set giving a pressure of 8 lb. per square inch, with the result that an increase of five miles an hour road speed was obtained. Tests of this sort, though exceedingly interesting, need to be of a very exhaustive nature if useful information is to be obtained from them, and the question of piston ring pressures is undoubtedly one of sufficient importance to warrant full investigation.



OVERSEAS SECTION.

A Commentary based upon Practical Experience and a Study of Overseas Opinions.

IT is somewhat surprising that Overseas riders have not taken more favourably to the lightweight. Members of *The Motor Cycle* staff are not without fairly wide experience of riding conditions in pioneer lands, and our opinion on this subject was endorsed a few days ago by a Colonial rider who has figured in many endurance tests in Australia and elsewhere. His opinion and ours is that the fitness of the lightweight is not sufficiently realised by the majority of Overseas riders, and that the firmly rooted idea that weight and power are necessary for pioneer roads is more or less erroneous.

Almost every Overseas rider is familiar with the tiring work of handling a heavy solo mount on really bad roads, where it is very often necessary to walk, run, or push. When in the saddle the physical strain of holding up a heavy machine on deep mud or over ruts is really very considerable, whereas it requires very little effort to hold up a lightweight amidst the most trying conditions.

Where Revision is Necessary.

Generally speaking, the modern lightweight is as well off for power at low speeds as the heavy twin—that is to say, it will go anywhere the twin will go. On account of its lightness it is nothing like so susceptible to wheel spin, side-slip, etc., and consequently is just as able on gradients. As regards speed it is no great guns, but on bad roads this is of no consequence, while on ordinary mediocre going there is little in it.

Many present-day lightweights fall short of Overseas requirements on various points of construction and design, but this by no means condemns the class. Others are as sturdily built and just as capable of standing rough usage as the best heavyweight. During the lightweight revival it is to be feared that the tendency was towards the production of a cheap machine, and it is difficult to say even yet whether any real degree of permanency has been attained. Stronger front forks with more efficient springing, heavier wheels, greater efficiency in mudguarding, and more substantial mudguard attachments are points which generally need revision, while it goes without saying that nothing will be more influential in establishing the universal popularity of the lightweight than some efficient system of rear springing.

JUDGMENT IN PURCHASE.

REGULARLY we receive letters from Overseas readers asking for advice on the subject of purchase, but it is impossible to answer such enquiries in a helpful way unless we happen to have some knowledge as to the local conditions concerned A small flat twin, for instance, or even a baby two-stroke, may give perfect satisfaction to a reader at B, but at C, only forty miles distant, anything short of a chain-driven twin would be practically useless.

So much is obvious on the face of things, and in the construction of the ideal Overseas mount no fixed rules can be laid down with regard to size of engine, type of transmission, and so on, as many readers attempt to do. Each type of machine is good in its own particular sphere, and, bearing in mind that the novice and prospective purchaser is ever with us, we cannot ram home too firmly the advice—if you have any choice in the matter, study the various types of machine and decide what power and transmission is most suitable for your locality. Half the grumbles we receive are the result of injudicious choice, not to any actual shortcomings in the machines.

Here we have a very prominent reason for American success Overseas. In England numerous types and powers of motor cycles are produced, while in America, practically speaking, only one type is generally recognised. It is undoubtedly a good type for use in pioneer lands, but it is unanimously agreed that for superlative workmanship and durability there is nothing to equal the British production. And why we so often hear the British machine unfavourably compared with the American is because the Overseas buyer, determined to make a patriotic purchase, has before him a selection of types, and is likely to buy quite the wrong machine for his work.

The Bran Pie of British Productions.

Let this point be clearly understood. The American is built in a land of rough roads and great distances, and it is more or less standard as to type. Large, low compression engines and a positive drive are recognised as the general thing, whereas in England it is difficult to point out two machines among the 250 different models produced that do not differ considerably in some vital point, and it sometimes requires skilled judgment to decide which design is best suited to one's individual requirements. Even in England, where local conditions do not prevail to any extent, we realise the likelihood of obtaining possession of a machine which may fall short of our own personal requirements, and so the Overseas purchaser, though he has not the range of choice before him that we have at home, is more likely to go wrong when he plunges his hand into the bran pie of British productions than if he grasps the tin soldier from the well-illuminated shelf of the American sale stall.

There is, of course, no denying the fact that a few British machines are quite unsuitable for use in

Overseas Section.—

pioneer lands, but it must be borne in mind that in 1914 the vast possibilities of Overseas markets were only just becoming realised, since when the numerous lessons of the war have been taken to heart in a manner which would never have been brought about by a decade of Overseas grumbles. To-day the British motor cycle industry is fully alive to the fact that when peace conditions return every effort must be made to expand Overseas sales, and this can only be done by proper supervision of sales departments and by offering suitable machines. That many leading makers are giving Overseas requirements their serious consideration we are convinced, and there is no doubt that the outcome of present day experience in the way of building machines to stand every degree of rough usage will settle all question as to the durability of foreign competition.

THE INFLUENCE OF ENVIRONMENT.

IT will be recalled by many of our readers that at the outbreak of war *The Motor Cycle* was making plans for the organisation of an Overseas trial—that is, a trial over a freak route in the British Isles, as nearly representing pioneer conditions as possible. The idea was greeted with some enthusiasm, and the event promised to be one of the greatest interest and usefulness—so much so, indeed, that, when peace returns, a trial of this sort will probably become a standing item on the annual programme. With manufacturers fully alive to the importance of Overseas markets, and with one or two American or Colonial riders accustomed to rough roads to toe the line with the rest, there is no doubt whatever that such a trial would be very keenly contested, and prove instructive to all concerned.

The war, however, is providing a trial of a more searching nature than could ever have been brought about by the ordinary course of events, and its general effect will be towards producing an ideal machine for Overseas use. The unrelenting test of two years of the most strenuous usage to which a machine could be put has proved defects in construction and design which few manufacturers realised, and, moreover, the men who are now using machines at the Front will, on returning home, make much the same demands as the Overseas rider has made hitherto. We have learnt more during the war as regards strength of construction and durability than could possibly have been taught us in many years of ordinary progress, and the sum of the experience gained will all be to the advantage of the Overseas rider.

Bad Roads in England.

It must not be imagined, however, that the testing of British motor cycles is normally limited to the broad highways, for in many parts of England are to be found lanes and mountain tracks which compare favourably with the average bullock cart road, and many manufacturers are in the habit of testing their machines over these freak routes—deep heather, peat swamps, boulders, and rivers being the common order. Amidst such surroundings much has been learnt as regards sidecar attachment, gear ratios, clutch efficiency, engine cooling, etc.

A Selection of Letters from Readers scattered all over the World.

OVERSEAS LETTERS.

AS usual, we append a few Overseas opinions gleaned from our letter-box. Unfortunately space does not permit our using many of the suggestive and interesting letters we receive from Overseas readers, but their non-appearance must in no way be taken as a reflection on their interest or usefulness.

American Machines Again.

MR. CRACKEN, Calcutta, India: "As soon as a shipload of American motor cycles arrives they are all sold out in a few weeks. I regret this state of affairs very much, but if the English manufacturer will stick to his old ideas of chain-cum-belt, small wheels, and high prices, then he must go to the wall. It is all very fine to be patriotic; at the same time we want value for our money, and in this respect the American twin undoubtedly leads."

Three Tracks Undesirable.

MR. HART K. BENNETT, Volksrust, Transvaal: "We have several regular readers of *The Motor Cycle* in Volksrust, and look forward to its arrival. One of the pleasing points we look for is the illustrations of improvements to machines. In regard to the Scott Sociable, the two-wheel track is preferable to the three-wheel track out here, for often on the country roads the centres are from 6in. to 12in. higher than the wheel tracks, and therefore unsuitable for three-wheel track machines. Motor cycle makers should give greater clearance for machines exported to South Africa."

Buying a Machine in Australia.

MR. F. E. SMITH, Toowoomba, Queensland, Australia: "Why is it that while British manufacturers are spending money on advertising their machines and accessories they do not at the same time advertise the names of their foreign agents? I have enquired for two or three machines, the merits of which I should have liked to go into, but have in each case been unable to find out whether these are stocked in Australia, while American machines were to be found without the slightest trouble. I might remark at the same time that having only an agent in Melbourne is about as much good to a Queenslander as having an agent in, say, Marseilles would be to a buyer in London."

A Satisfactory Two-stroke.

MR. E. G. HOWARD, Adelaide, South Australia: "I have been much interested in your correspondents' experiences with two-strokes, and perhaps mine at this end of the globe may be interesting to your readers. I have been the possessor of a Baby Triumph for over a year now, and all the symptoms described in your paper are entirely absent with my machine. I have never had the mysterious rattle; it never four-strokes, even at the slowest speeds; and, contrary to 'Ixion's' experiences, it always fires regularly starting from cold, no matter how long standing. It will take me over the Mount Lofty Range on top gear with the exception of one pinch, which is 'some' climbing. Whether the condition of the atmosphere out here accounts for it I do not know. Certainly I look well after it and keep the cylinder clean. The engine shows no sign of wear yet. The disclaimer is not necessary at this distance."

The Overseas Summary.

"SOUTHERN CROSS," Farnborough, Hants: "I have read with very great interest your 'Summary of a Year's Correspondence on the Overseas Motor Cycle' in your issue of January 4th.

"Having recently arrived 'home' (on special leave for war work) from New Zealand, where I have been connected for a number of years with the motor branch of a large Government department, may I congratulate you on the manner in which you have summarised and shown several of the defects which should be overcome in machines intended for Colonial use?

"If British manufacturers and their agents would only take as a motto what your Australian reader so expressively puts, 'American standards of service plus British standard in quality of goods,' the Colonial market is assured for their products.

Overseas Section.—

"There is little in your summary that can be criticised, and I can fully endorse most of the points you have brought out. We have found that for the heavier class of machine the all-chain drive with countershaft clutch stands up the best, but invariably the rear chain cases and original mudguards are cast away. The chain cases are generally replaced by a strip of steel plate which acts as a stoneguard, and mudguards of a wider section, heavier gauge, and with stronger stays, are fitted. The shallow ground clearance of engines, silencers, and exhaust pipes (and magnetos on some makes) must be remedied. One manufacturer has already increased the clearance on a new model in these respects, and larger capacity tanks, tool bags, etc., are also apparently having attention.

"Engine capacity is, as you state, an open question, and we have cycles with engines ranging from 2¾ h.p. to 8 h.p., each efficient in its own particular sphere of action.

"We have found that, where machines are in constant use in all conditions of weather and roads, black is the most serviceable colour.

"Commercial sidecar frames need considerable improvement both in design and material; some models we have had to rebuild throughout.

"I hope that these few lines may assist you to drive home the fact that British manufacturers must get away from a system of 'tai-hoa' (the South Sea Islander's expression akin to 'wait and see'), if they purpose keeping the large markets of Australia. Opposition is made more severe by the opening of the Panama Canal, facilitating shipping from the U.S.A., as well as helping to maintain 'American standard of service.'

"Wishing your paper the continued success which it deserves."

American Comparisons.

Mr. C. H. Mann, India: "I notice in your 'Overseas Opinions' in some of your recent issues, that several correspondents are rather bemoaning the fact that certain American motor cycles are ousting English makes. This is certainly a fact that is to be deplored; but, after all, riders in the Colonies must study their own comfort, and if British makers will not construct a practical machine for Colonial use and roads (?) then the American firms will get the orders.

"Look at the advantages of, say, the American 7 h.p. machines over any single British-made one: (1) Cradle spring frame; (2) 28in. × 3in. strong and heavy tyres; (3) mechanical oil pump; (4) very good clutches and plates, which will stand a lot of wear; (5) a good three-speed gear box, compact and strong; (6) last, but not least, the chain drive—an absolute necessity in the 'rains' out here. Most people here have a sidecar, partly to carry things and partly to steady the bicycle, so that if coolies deliberately wander and do 'tangoes' just in front of your bicycle there is a chance of your not coming off the machine (they frequently do this, by the way). The heavy 7 h.p. Indian is splendid with a sidecar and holds the road well. The laminated spring frame just rocks one over holes, etc., and is far superior to spiral springing, which recoils too quickly."

The American Invasion.

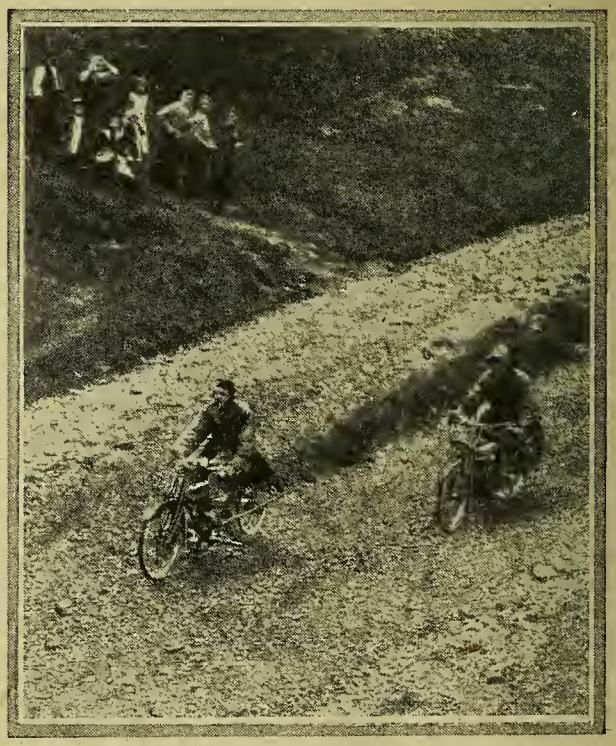
Mr. A. C. Trevor, Adelaide, South Australia: "I take the opportunity of your 'Letters from Overseas Readers' section of your excellent paper to warn you, as many others have warned before me, that the English motor cycle market is dwindling rapidly, and will almost disappear soon if the British manufacturer does not wake up to the realisation of the enormous hold America is getting on the trade. The reason for this preference for U.S.A. motor cycles out here is obvious, in that they are the machines best suited for standing the Australian road and climatic conditions. Far be it from me to decry the English power unit, which is, in most cases, a beautiful piece of work, and is represented out here to the largest extent by the J.A.P. As a matter of fact, the following remark made while looking at a powerful American is often heard: 'Put an 8 h.p. J.A.P. in that frame and you have the perfect machine.' My remarks are made chiefly in regard to the English builders' almost complete lack of interest in the big twin, and his apparent inability to see that a spring frame in these parts is becoming almost a necessity. Of course, we all agree that the A.J.S., Clyno, and a few other sidecar machines are probably all that could be desired on the roads of the Old Country; but in this country they are undoubtedly uncomfortable. There are two or three of the American features that I consider it would pay to adopt, namely, the excellent system of twist grip control, larger and more efficient brakes, 28in. wheels, 3in. tyres, and last, but not least, a spring frame of some description. If an English cycle of about 8 h.p. embodying the above features could be sold out here for about £90 (the average price of big American twins) instead of £110-£115 it would become very popular."

The Simple Single.

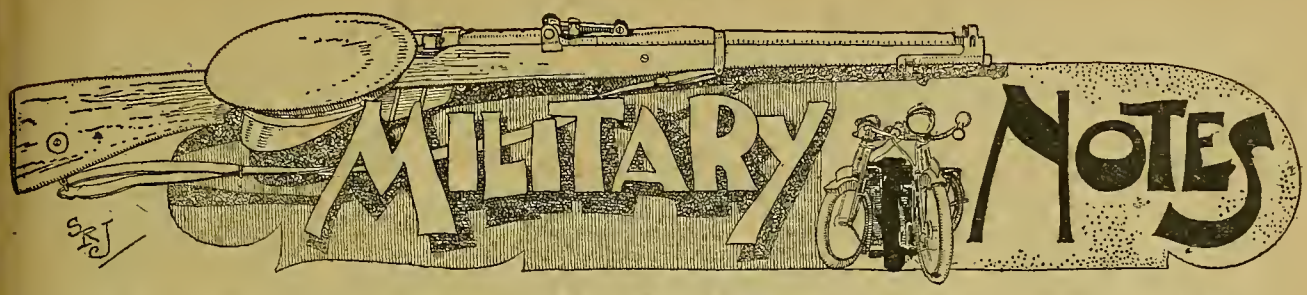
Mr. W. Pointer, Fort Beaufort, C.P., South Africa: "I have ridden a 5-6 h.p. Rudge Multi single-cylinder for the past few years in a hilly district of the Cape Colony. The full power of this engine has never been required, therefore I fail to see the necessity for more cylinders, with their corresponding extra complication, expense, etc. The only drawback to a single-cylinder is the fact that one's mechanical knowledge is apt to get rusty, its reliability being so absolutely monotonous. In the year 1900 I rode a single-cylinder De Dion tricycle. I had no mechanical knowledge, but, in spite of this fact, I never once got stranded. 'Ixion' compares the comfort of twin and single-cylinders; in my opinion, both are free enough from vibration at normal speeds."

More Grumbles.

Mr. J. S. Watson, Dudley, N.S.W.: "I suppose you are about tired of hearing Australian motor cyclists grumbling about cost of renewals and spares for British-built machines. One thing I would be pleased to see explained: A rider of an Indian can (I am told) buy his spares and renewals in Sydney at a very small advance on what he would pay in New York. I use an English machine. In Sydney I am charged for renewals at the rate of 200 to 250% advance on English list prices! Please don't blame this on the war. Agents were charging just as much prior to the war. I do not think we shall see any change for the better until the big British makers establish their own depôts out here."



It is not difficult to find roads in England which vie with colonial conditions of surface. These "roads" are in many cases used by British manufacturers as test ground for Overseas models.



"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS "TANKS."

WELL KNOWN TO MOTOR MACHINE GUNNERS.

AMONG the officers and men brought to the notice of the Secretary of State for War for distinguished services rendered in connection with the war, is Lt.-Col. R. W. Bradley, D.S.O., South Wales Borderers and M.G.C., formerly Commanding Officer of the Motor Machine Gun Training Centre at Bisley Camp.

HONOURS FOR MOTOR CYCLIST AIRMAN.

THAT dashing motor cyclist, Capt. John Woodacre Woodhouse, of the Royal Flying Corps, has been awarded a bar to his Military Cross. Woodhouse will be recalled as a frequent competitor in Tourist Trophy races and motor cycle reliability trials of the past. His Military Cross was obtained for gallant conduct on the Western Front. Capt. Woodhouse is at present stationed in England. A further distinction for Capt. Woodhouse was the inclusion of his name in the War Office list, dated January 25th, of officers and men mentioned for distinguished war services.

SKILLED RECRUITS WANTED.

YOUTHS of eighteen years of age who have passed through an apprenticeship in one or other of the skilled engineering trades, but are not fully occupied on war work in the shipyards or munition factories, may report to their recruiting officer, and request to be trade-tested, passing as artificers. There are vacancies for such lads in the Royal Engineers, Royal Flying Corps, Army Service Corps, and Machine Gun Corps, Heavy Section (Tanks), and also in the Royal Regiment of Artillery and the Army Ordnance Corps.

TESTING WAR OFFICE MOTOR CYCLES.

HITHERTO the P. and M. motor cycles manufactured for the Royal Flying Corps have always been subjected to a very severe test on Brooklands Track, and accounts of the tests have appeared in these columns in the past. Owing to the unfailing regularity with which the machines have fulfilled this test, the Ministry of Munitions has decided that the tests are no longer necessary, and they are therefore being discontinued. The whole of the P. and M. production is, of course, still being delivered to the Government.

SIDECAR AMBULANCES IN FRANCE.

AT the present time the British Ambulance Committee, attached to the Service de Santé Militaire, 23a, Bruton Street, London, W., have no fewer than five convoys of motor or ambulance cars, together with a motor cyclist stretcher car section, working with the French forces at vital points between the Somme and the Vosges.

The expenses of maintenance and upkeep are heavy, and, apart from the administration charges, vehicles destroyed by enemy fire and those used up by the wear and tear of active service must be renewed.

It is to the general public that the promoters look for the necessary funds to enable them to carry on their good work. From time to time vacancies occur for capable volunteer drivers. Particulars of service can be obtained from, and subscriptions may be sent to, the headquarters in London.

PROMOTION FOR A.C.U. TRIALS JUDGE.

WE note with pleasure that Maj. A. E. Davidson, D.S.O., R.E., Assistant Director of Mechanical Transport, graded for pay as A.Q.M.G., is to be a temporary lieutenant-colonel while so employed.

Col. Davidson is well known to a large number of motor cyclists, as he acted as judge in numerous A.C.U. trials and competitions.

Lt.-Col. Davidson, D.S.O., R.E.

For many years Col. Davidson has been associated with mechanical transport for the Army, and before the motor transport section of the A.S.C. was established he was one of the secretaries of the Mechanical Transport Committee of the War Office.

He served in the South African war, and was in charge of the only form of mechanical transport then in force, namely, the traction engine. Later on he became a keen devotee of the internal combustion engine, and made a careful study of the motor bicycle employed for military purposes. He was largely responsible for the Army being supplied with motor bicycles at the outbreak of war.

MORE GOVERNMENT MOTOR CYCLES.

THE Enfield Cycle Co., Ltd., Redditch, has just received through the Ministry of Munitions a further large order for 6 h.p. and 8 h.p. Royal Enfield motor cycles. Enfield sidecars were among the earliest equipment of the Motor Machine Gun Service, and for many months past have rendered magnificent service in France.

A WELL-KNOWN MOTOR MOUNTAINEER CLIMBS HIGHER.

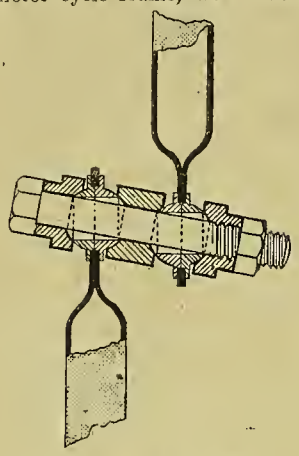
AMONGST the officers mentioned by Field Marshal Sir Douglas Haig in his New Year despatches is the name of Maj. W. B. Little, so well known in the happy hill hunting days, when Helvellyn, Skiddaw, and many northern mountains were climbed. The name is familiar also to innumerable trials riders. Little's promotion has been remarkable. When last mentioned in *The Motor Cycle* he had been appointed Staff Captain with the Durham Light Infantry in the 151st Brigade. Last autumn, after earlier having received the Military Cross, he was taken from Territorial rank, and became a captain in the Regular Army. Since then hard fighting has been experienced under severe conditions in the trenches, mainly with the Border Regiments. Maj. W. B. Little, the genial friend of many a motor sportsman, is much beloved by the men of the 5th Border Regt., who are at present under his command.

In his latest letter he modestly tells of a narrow escape which befell his party. He writes: "Snow and frost! The cold is intense. We are where the shells fall thickest; in fact, a few minutes ago a 'blighter' knocked in the end of our dug-out, and we are just trying to get it cleared. It was also a narrow shave a few days ago, when along with my orderly I was buried by the 'exhaust' of half a dozen shells which landed a few yards from us." His numerous friends will wish Maj. W. B. Little similar good luck in the future.

A NOVEL FRAME CONSTRUCTION.

Mr. Alfred A. Scott's latest Patent of a Triangulated Frame Design embodying Interchangeable Tube Members.

MR. ALFRED A. SCOTT is one of the few inventors whose productions never in any way appear to be disturbed by the conventional order of things, and when, some months ago, we heard that he was busy on an entirely new motor cycle frame, we immediately



Nut and bolt fixing, showing the domes and spherical washers which allow for the angular position of the tubes.

anticipated something out of the ordinary. Now that we have had full opportunity of examining this latest invention and discussing its possibilities with its ingenious inventor, we are by no means disappointed, and though the frame as yet remains to be tried on the road, it will be recalled that the Scott Sociable, which we have already described and tested, embodies a somewhat similar principle as regards frame construction.

The primary aims of Mr. Scott in designing his new motor cycle frame were:

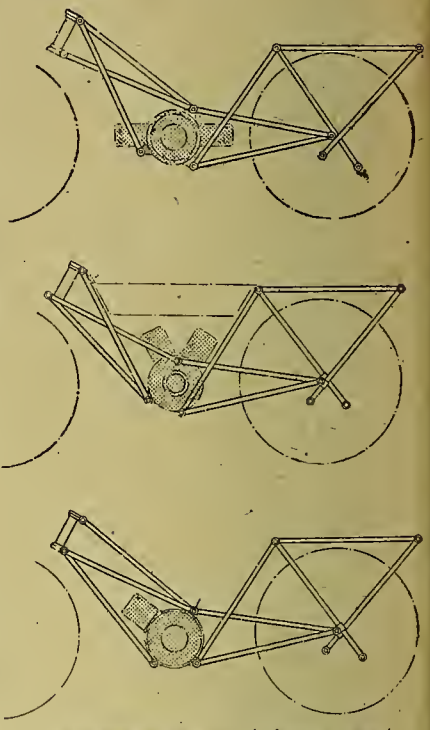
1. To eliminate bending and twisting strain in the members.
2. So to construct the framework that in case of an accident any damaged member occupying an important position can be withdrawn from the frame and instantly replaced, either by some member occupying a less important position in the structure, or by a spare tube length.
3. To evolve a frame which consists of a number of identical and standard tube lengths, which on reference to a plan can be assembled into a complete frame without brazing or other heat treatment.
4. To reduce weight and cost of production.
5. To obtain maximum strength by the employment of interconnected triangular structures built up round the engine, which forms the base or foundation of the framework.

Interchangeable Frame Members.

In this invention Mr. Scott has an entirely open field before him, and, as will be seen from our drawings (which show the new frame adapted to various types of engines, including the flat twin), the structure consists of a number of eye-headed standard tube lengths, the end of each tube being flattened and punched so as to form an eyepiece. In place of brazed junction lugs, nut and bolt fixings are used throughout the frame, but it is clear that, to allow for the necessary angular position of the various members, some adaptable mode of fixing was necessary.

Nut and Bolt Fixings.

The arrangement adopted is clearly shown in one of our sketches. The aperture of the eyelets on each side are domed spherically, while spherically recessed washers, or packing pieces, are placed over the bolt, one on either side of the dome. The eyelets are somewhat larger than the bolt, so that the nut can be drawn up tightly with the members in any angular position within limits.



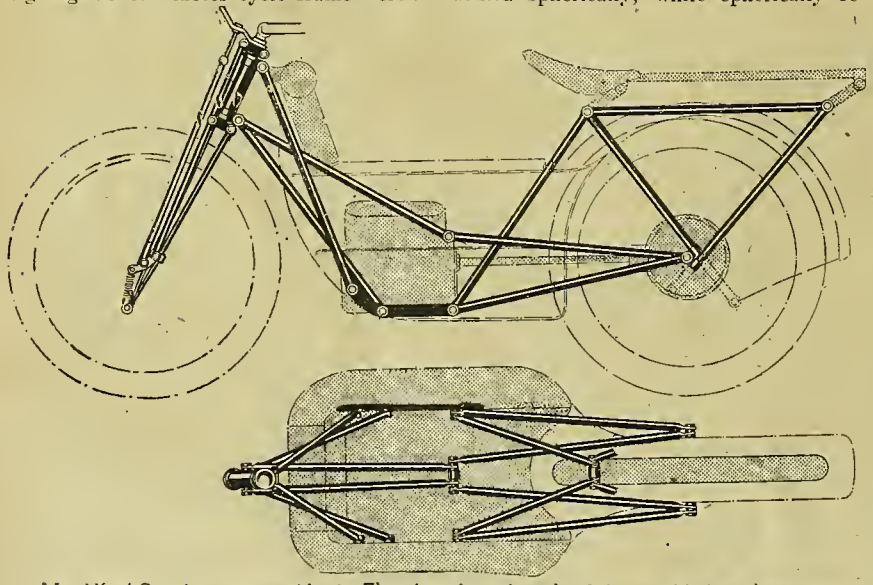
Three alternative frame designs, arranged to accommodate respectively flat twin, V-type, or inclined engines.

The Fundamental Principle.

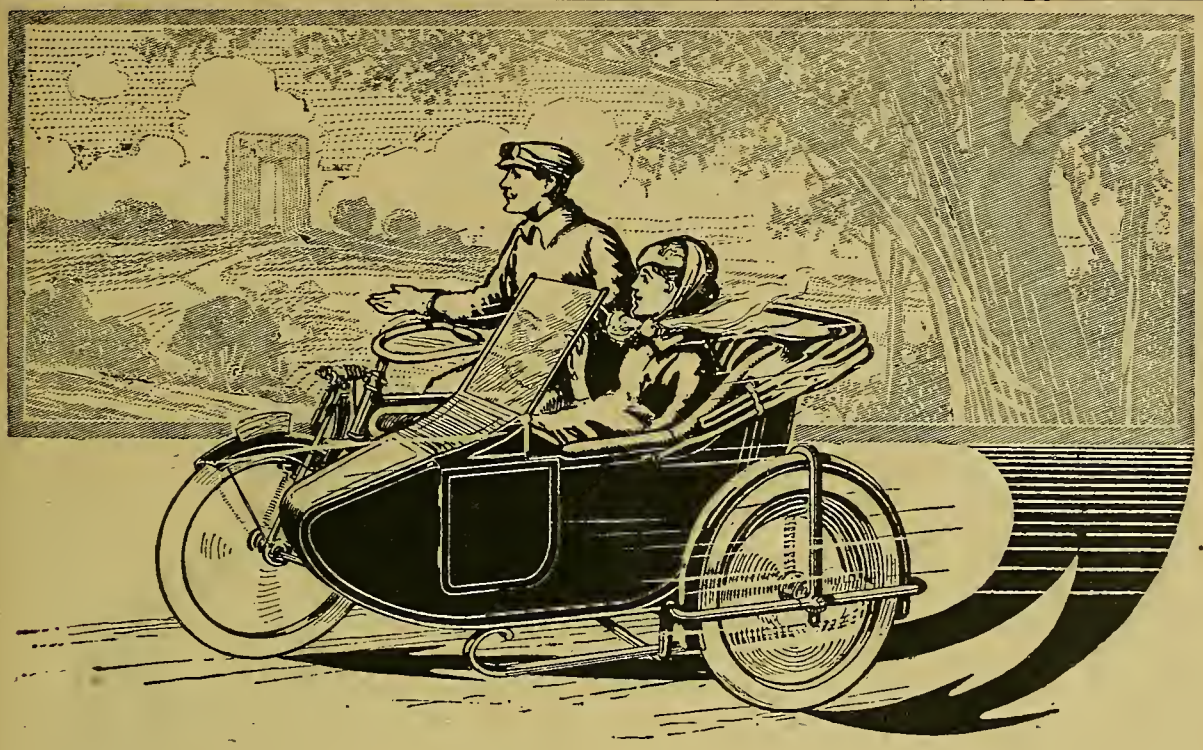
A glance at the frames illustrated conveys some idea as to the engineering skill which has been brought to bear on their design. It will also be noted how readily this type of frame adapts itself to any form of power unit. The engine in every case forms the foundation of a triangular structure, while the steering head forms a similar base, all stresses being met by straight tubes, which are subjected to no bending strains whatever. The elimination of all intermediate stresses renders possible the employment of much lighter gauge tubes than it would be safe to use in a structure of unmechanical design. The frame is triangular in every direction, that is, whether viewed in plan or side elevation—so that in whatever direction the strains fall they are met by interconnected and interchangeable struts, which are subjected only to direct tension or compression.

Vertical Rigidity.

To restrain any tendency on the part of the steering head to oscillate, members are carried from a point high up on the steering head to the respective sides of the engine base, while similarly two members pass from the seat down to the engine base, thus forming the seat apex, and tending to resist torque stresses.



Mr. Alfred Scott's very latest idea! Elevation of a triangulated frame with interchangeable tubing. The saddle is mounted on parallel links and the carrier is sprung in unison.



¶ The one economical factor left in motoring to-day — the one cheerful feature of the motor cyclist's landscape—is Avon Endurance. In war, as in peace, Avons fight the battle of the road with the single aim to "get you there" at least trouble and lowest cost.

¶ Prices substantially reduced since War commenced, but the same fine range of weights to select from.

AVON TYRES

Full illustrated Catalogue free from—

Avon India Rubber Co., Ltd., 19, Newman Street, Oxford Street, London, W.

Depots—Manchester. Birmingham. Glasgow. Bristol. Newcastle. Nottingham. Aberdeen. Swansea. Paris.

1,000 Agents hold stocks. Ample supplies available.

In answering this advertisement it is desirable to mention "The Motor Cycle."

B5

DUNLOP
EFFICIENCY

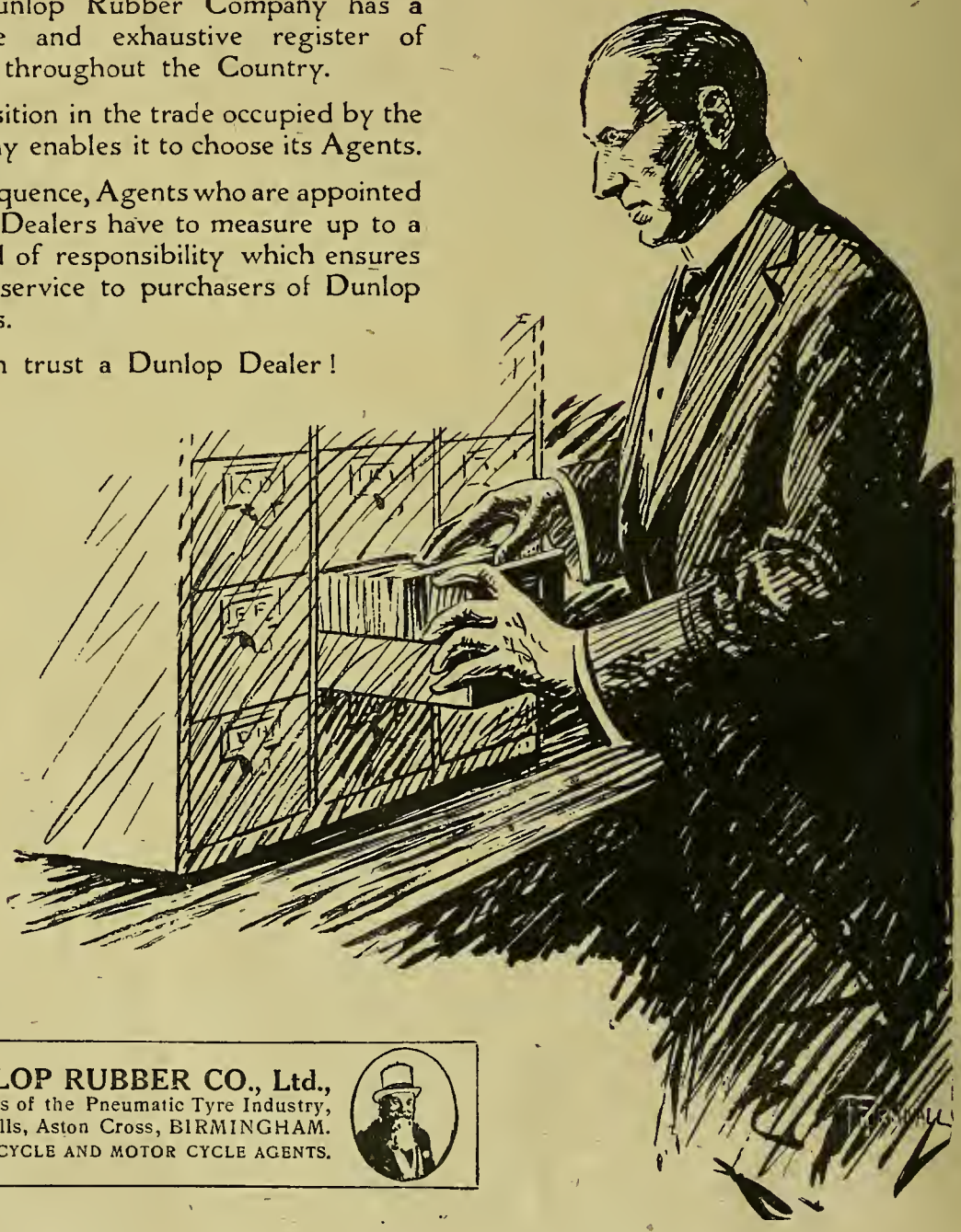
Number One.

The Dunlop Rubber Company has a complete and exhaustive register of Agents throughout the Country.

The position in the trade occupied by the Company enables it to choose its Agents.

In consequence, Agents who are appointed Dunlop Dealers have to measure up to a standard of responsibility which ensures efficient service to purchasers of Dunlop products.

You can trust a Dunlop Dealer!



DUNLOP RUBBER CO., Ltd.,
Founders of the Pneumatic Tyre Industry,
Para Mills, Aston Cross, BIRMINGHAM.
OF ALL CYCLE AND MOTOR CYCLE AGENTS.

Saddle Height Adjustment.

The two saddle members extending from the seat to the rear wheel axle are attached at their lower extremity by means of clips, which act as a medium whereby the saddle height is adjusted. So far as is possible the front forks also are built up of standard tube lengths, the springing, as will be seen, being effected on a simple cantilever system.

In case of accident on the road which involves the breakage of an important frame member, the mishap would not necessarily strand the rider, since a less important member—say, for instance, one of the back carrier stays—could immediately be substituted for the broken tube, and the machine ridden thus till a new tube length had been obtained. The frame can be very speedily assembled, and errors in alignment, the avoiding of which require so much care and skill when brazed lugs are used, cannot readily occur. Frame breakages are generally due to the burning of a tube in brazing—a liability entirely eliminated in this design, which has no brazed junction lugs to weaken the frame.

The principle of this new departure in frame design is unquestionably one deserving the thought of automobile engineers, the advantages it offers, not only in the way of cheapness, lightness, and convenience, but also for compact shipment to foreign markets, being vitally important points.

FROM A BELGIAN ENTHUSIAST.

E. TAYMANS, secretary of the Brussels Motor Club, writing from Le Havre, says: "People abroad would never imagine the vile state of the roads upon which we are obliged to ride. In fact, they are no longer roads, but a succession of big pot-holes, some of them deep enough to drown a dog in. Moreover, the very poor quality of the lubricating oil issued to us tries the unhappy engines to the full. The way the James sidecar performs its task speaks well for this make of machine, the James being about the only sidecar machine in the Belgian Army. For solo riding we have all sorts of machines, most of them, happily, of British manufacture: Triumphs, Rudges, Humbers, Premiers, Royal Enfields, even an old 1905 4½ h.p. twin Minerva, which has been in service since the beginning of the war, and on which I personally covered over 3,500 miles in two months' time. Our main trouble is caused by mud running down the front forks into the hubs, which, though dismantled every week, wear out all too quickly.

"It is a pity manufacturers do not realise that the size of the tyres they fit are, generally speaking, much too small, for anything under 2½in. ruins the rims very quickly. In fact, the only really reliable tyres I had were the 760×90 voiturette (Ford) tyres which I fitted to my Indian instead of the 26×3in. usually fitted. They fit beautifully on the standard rims, and when run slightly deflated give very smooth running. Their long life repays their slightly higher cost. We usually fit 700×80 on all 650×65 (Rudge) rims, with much benefit to the comfort of rider as well as to the durability of the machine.

"On the whole, we are surprised at the way the motor cycles stand to their work in these appalling conditions. In peace time we used to grumble at the roads, but now—!! However, we keep enthusiastic about our hobby, and I for one hope the Germans will not have stolen the trusty T.T. racing Triumph which I used to ride in trials previous to the war.

"I wish you and your paper (which I have read since 1906) every success."

PETROL AFTER THE WAR.

A contemporary remarks that it would not be too much to hope that the Petrol Trust might receive attention in due course at the hands of the State. But the suggestion comes too late—*The Motor Cycle* in the issue of January 4th made a hint that the Government had already moved in the matter of the control of petrol supplies after the war.

E. Taymans, Motocycliste Militaire Belge, C.T.H. Le Havre, on a Premier, and his brother on a James. In some of the roads in the district, we are told, there are pot-holes big enough to hide a dog.

Average Prices of Second-hand Machines.

WE give below the average prices of second-hand models offered for sale in *The Motor Cycle*. Where it is possible to obtain a sufficient number of each model the average for the past week is quoted, otherwise the last average is given, if within four weeks. Difficulty in obtaining a sufficient number of one particular model often arises, owing to the fact that many advertisers omit some of the most essential details.

Make	Year	H.P	Average for last week.	Latest weekly average obtainable
A.J.S.	1916	6 3-sp. sidecar	—	£95
,,	1913	6 3-sp. sidecar	—	£48
,,	1914	6 3-sp. sidecar	£58	—
,,	1916	2¾ 3-speed	£55	—
Allon	1916	2-stroke 2-speed	£36	—
,,	1915	2-stroke 2-speed	£28	—
Ariel	1916	5 3-sp. sidecar	—	£76
Bat	1913	8 2-speed	—	£39
Bradbury	1913	4 2-sp. sidecar	£30	—
B.S.A.	1916	4½ 3-sp. sidecar	£58	—
,,	1916	4½ 3-speed	—	£55
,,	1915	4½ 3-sp. sidecar	£55	—
,,	1913	4½ free engine	£27	—
Calthorpe	1916	2¾ 2-speed	—	£25
,,	1915		£20	—
Clyno	1913	6 3-sp. sidecar	—	£40
,,	1914	6 3-sp. sidecar	£62	—
Connaught	1914	2-stroke	—	£18
Douglas	1916	2¾ W.D	—	£50
,,	1915	2¾ 3-speed	£45	—
,,	1915	2¾ 2-speed	£43	—
,,	1914	2¾ 2-speed	£38	—
,,	1913	2¾ 2-speed	£31	—
,,	1915	4 2-sp. sidecar	£60	—
Enfield	1916	6 2-sp. sidecar	£79	—
,,	1915	6 2-sp. sidecar	£60	—
,,	1916	3 2-speed	—	£47
,,	1915	3 2-speed	—	£38
H.-Davidson	1916	7 3-sp. sidecar	—	£82
,,	1915	7 3-sp. sidecar	£68	—
Humber	1914	3½ 3-speed	—	£35
Indian	1916	Powerplus sidecar	—	£83
,,	1915	7 3-sp. sidecar	£58	—
,,	1915	5 3-speed	—	£51
Ivy	1915	2-stroke 2-speed	£25	—
James	1915	4½ 3-sp. sidecar	—	£68
Levis	1915	2½ 2-stroke	£20	—
,,	1916	2½ 2-speed	£28	—
Matchless	1915	8 3-sp. sidecar	£78	—
New Hudson	1916	2-stroke	—	£34
,,	1915	4 3-sp. sidecar	£52	—
New Imperial	1916	2½ J.A.P.	£33	—
Norton	1916	4 3-speed	—	£48
P. & M.	1914	3½ 2-sp. sidecar	—	£55
Premier	1914	3½ sidecar	£45	—
Rover	1916	3½ T.T.	—	£56
,,	1914	3½ 3-sp. sidecar	£48	—
Rudge	1913	3½ multi	—	£20
,,	1915	3½ multi sidecar	—	£45
Scott	1916	3¼ 2-sp. sidecar	—	£58
,,	1913	3¼ 2-sp. sidecar	£35	—
Sunbeam	1916	8 sidecar	—	£100
,,	1916	3½ 3-sp. sidecar	£75	—
,,	1915	3½ 3-sp. sidecar	£70	—
Triumph	1916	4 3-sp. sidecar	£70	—
,,	1915	4 3-sp. sidecar	—	£60
,,	1914	4 3-sp. sidecar	£45	—
,,	1913	3½ 2-sp. sidecar	£3	—
Zenith	1916	8 sidecar	—	£80
,,	1914	8 Gradua sideca	£4	—

TIMES TO LIGHT LAMPS.

GREENWICH TIME.

Feb. 1	... ...	5.17 p.m.
,, 3	... ...	5.20 ,,
,, 5	... ...	5.24 ,,
,, 7	... ...	5.27 ,,

That Erring Compositor.

A trade contemporary refers to a *five*-speed Triumph having been seen on the road. Arguments in favour of four speeds we have had in plenty, but we recollect no rider of experience urging the desirability of *five* speeds. A misprint, no doubt.

Petrol Substitutes—the Solution.

Though petrol licences are not now available for those henceforward joining the ranks of motorists, it must be remembered that excellent substitutes for petrol still abound, and at figures more favourable than petrol. Thus there is nothing to prevent new converts taking up motor cycles if work can be performed more quickly and efficiently by their use.

Foreign Exports.

We are informed by the Commercial Intelligence Branch of the Board of Trade that in a supplement to the *Board of Trade Journal* of January 25th was given a complete list of articles which, according to the latest information received by the Board of Trade, are prohibited exportation to various destinations—from the Straits Settlements, Hong Kong, Nigeria, Gold Coast, Jamaica, Barbadoes, Trinidad and Tobago, and British Guiana. The Supplement can be obtained through any bookseller, or direct from His Majesty's Stationery Office, Imperial House, Kingsway, W.C.

Mr. Charles A. Hyde, the new president of the Cycle and Motor Cycle Manufacturers' and Traders' Union.

A Juvenile Dorando.

Recently a member of our staff was riding the Great North Road on a powerful twin when he discovered that his spare tube case had dropped off. Returning to look for it he found a very small boy cheerfuly pursuing him, the spare tube case in his hand. Apparently the youngster entertained lively hopes of overtaking the motor cyclist in the next mile or so!

Institution of Automobile Engineers.

At the fifth meeting of the session of the Institution of Automobile Engineers, to be held on the 14th of February in the Hall of the Royal Society of Arts, John Street, Adelphi, W.C., Mr. F. L. Martineau, M.I.Mech.E., will read a paper on "Hydraulic Transmission."

Cards of invitation may be obtained on application to the Secretary of the Institution, 28, Victoria Street, London, S.W.

We All Agree!

Our contemporary, *The Scottish Cyclist and Motor Cyclist*, refers to the fact that American writers are repudiating the invention of the term "flat" twin as a substitute for "horizontal" twin. "But what is there to repudiate?" enquires our Scottish contemporary. "Isn't 'flat' twin just as descriptive and useful as 'horizontal' twin, and a lot shorter to think, say, or write?"

Following upon the Irish opinion, stated last week, it is clear that the British Isles, at any rate, are agreed upon the term.

New Officers of the Manufacturers' Union.

At a Management Committee meeting of the Cycle and Motor Cycle Manufacturers' and Traders' Union, held in Coventry on January 23rd, the resignation of the president, Mr. Harry Smith (the Rover Co.), was received with regret. We understand that the reason for the resignation of Mr. Harry Smith is that the Rover Co. is no longer engaged in the manufacture of either cycles or motor cycles. Mr. S. Bettmann (vice-president) having also resigned, the committee were under the necessity of filling the vacancies until the next annual meeting. The only remaining vice-president, Mr. C. A. Hyde (Birmingham Small Arms), was therefore elevated to the presidency, while the two vice-presidents chosen were Mr. Bernard Steeley (Joseph Lucas, Ltd.) and Mr. J. R. Nisbet (Bowden Wire). A further change was made in the administrative staff, Mr. A. Bednell becoming general manager of the Union and Mr. Timerick secretary.

SPECIAL FEATURES:

INSTRUCTIVE OVERSEAS COMMENT.
A NOVEL FRAME CONSTRUCTION.
CAM DESIGN.

Fully Equipped!

In the current issue of a popular British magazine a gasoline launch is illustrated having a smoke funnel. Possibly the artist thought that gasoline was related to vaseline, and required a furnace to carburate it.

Returned to Civilian Life.

We are informed by the Ariel Works, Ltd., that they have obtained the services of Mr. J. W. Stocks as general manager of Components, Ltd., and Ariel Works, Ltd.

Mr. Stocks has long been a prominent figure in the motoring world. An old racing cyclist, holder of the World's Hour Record, and winner of the 100 Kilometres World's Championship, he was also one of the earliest members of the R.A.C., and one of the first motorists to race with Messrs. S. F. Edge and Charles Jarrott on the De Dion motor tricycle at the end of last century. Mr. Stocks also drove in the Gordon-Bennett Race of 1903, and for many years—in fact, right up to the outbreak of war—he made a practice of driving from London to the annual motor show in Scotland.

More Varied Experiences.

For six years, terminating in 1907, Mr. Stocks was general manager of De Dion Bouton, Ltd. He left England in June, 1915, for Gallipoli in charge of a Machine Gun Squadron, and, after rather a trying time, which included the Suvla Bay landing, he was wounded on October 18th, 1915.

Mr. J. W. Stocks, the new general manager of Components, Ltd., and Ariel Works, Ltd.

The Use of Cameras.

Nowadays a photographer has to go about his work very warily. Amateur photographers in particular run many risks in exposing a camera at all. One, for instance, was arrested the other day for photographing a man sweeping snow!

Proposed Association of Private Owners.

An adjourned meeting was held on January 16th, and, though the attendance was small, it was evident that feeling was in favour of the formation of an association. It was, however, recognised that, owing to the absence of so many small car owners and for other reasons, the moment is inopportune for launching the organisation, though it was agreed upon to form a small committee which, at its own expense, is to take into consideration the views of its members. The acting secretary, Major H. Vane Stow, 353, Strand, London, W.C., will be glad to receive views from those interested.

Coroner's Plea for More Lights.

Mr. Ingleby Oddie, the Lambeth coroner, on the inquest on the body of a man who was killed by a R.F.C. motor car on Sunday evening, January 21st, suggested that the lighting regulations had been carried too far. Everyone, he said, appreciated the necessity of darkening our streets, but he had never heard of Zeppelins arriving before nine o'clock in the evening. Between sundown and nine o'clock were the hours of greatest danger, for it was then that many people were hurrying home through darkened streets. It was a question, he added, whether the time had not come when full lights should be allowed—at any rate till 9.30.

The "Crush Four."

The people who made the regulations, said Mr. Oddie, perhaps did not travel by trams and omnibuses, and so did not realise what a terrible state of things existed in London during the "crush hours" at night. In his own district, during October, November, and December, 1913, there were seventeen inquests due to street accidents, while during the same months of 1916 there were forty-seven!

No one realises the difficulties and dangers referred to more fully than the motorist.

The R.A.C. a Government Office.

It was announced on Saturday that the Royal Automobile Club buildings would be taken over by the Government for use as offices. Several daily journals, which have not taken the trouble to enquire as to the immense help given to the nation by this institution, have urged that this step should be taken. It is not generally known that the R.A.C.'s organisation has been at the disposal of the War Office and the Ministry of Munitions since the war started, and much valuable—we might say invaluable—help has been given. The technical department has done useful work for the War Office, and the Club's engineer has devoted his attentions to the British Red Cross Society.

It is said that the decision as to the Government Department to which the immense building will be assigned is still in abeyance.

A Remarkable One Lunger.

A truly remarkable runabout is the subject of an article and illustrations in yesterday's issue of *The Light Car*. The machine has a 3½ h.p. air-cooled single-cylinder engine and belt transmission, and the weight is no more than the average sidecar combination. The body is built like a boat, and, what is more, it has a keel like a boat and no other frame; the body takes the driving strain, and the belt runs outside the body. This (bracketed with the Carden) is certainly the nearest approach to a motor cycle on four wheels.

A New Profession.

The latest addition to the records of crime is the stealing of London taxicabs. The cabs are stolen only in so far as they are removed from the idle rank by a man alleged to be wearing the uniform of the British Motor Cab Co.—often from under the very nose of their rightful drivers—and after being driven some miles by this enterprising gentleman they are left in a quiet side street—minus magneto! In this way the man acquired possession of four magnetos last week—one on Monday, two on Tuesday, and one on Wednesday—not bad going! He must be making quite a good thing out of it, and one wonders whether he will shortly switch on to omnibuses.

Blackpool National Motor Volunteers.

The Blackpool N.M.V. met last week to do honour to their commandant, Conn. A. Lindsay Parkinson, the Mayor of Blackpool, and their sub-commandant, Mr. J. Prestwich. Each of them was presented with a sword, a symbol of appreciation, by the N.C.O.'s and men of the services rendered to the command by the two officers. The interesting ceremony coincided with the announcement that the War Office had at length given recognition to the National Motor Volunteers.

Amendments to Lighting Order.

Amendments to the Lighting Order were issued on Tuesday morning, a number of towns on the south-east coast now being affected by Part III. as well as Part II. of the Order. The towns in which Part III. applies have now been reduced by the latest regulations to Colchester, Harwich, Dover, Folkestone, Hythe, Margate, Ramsgate, Sandgate Urban District, Felixstowe, Ipswich, and Walton Urban District.

Quaint Grounds for Exemption.

A Mansfield hosiery worker informed the local tribunal that he had discovered a new spirit which had been successfully tested on motors and which was likely to supplant petrol. The Ministry of Munitions was testing its efficiency, and he felt sure that the spirit would be of great value to the country. On these grounds he appealed for exemption, which was granted pending a reply from the Munitions Department as to the result of its tests.

Features of this Issue.

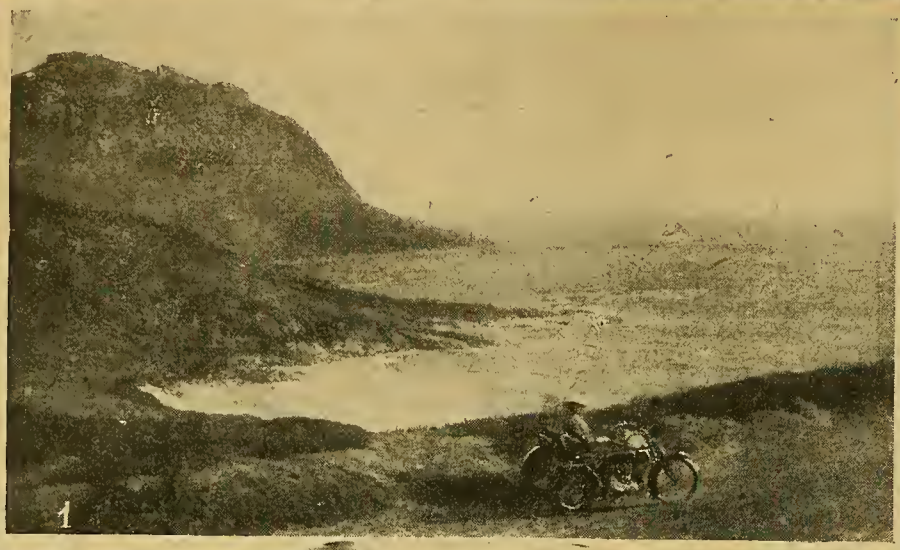
This week's issue of *The Motor Cycle* contains several exclusive and interesting features, foremost among which may be mentioned an illustrated description of Mr. Alfred A. Scott's new frame, the Overseas notes and readers' opinions, points of design in the new Matchless flat twin, and a striking series of double-page illustrations depicting a coastal ramble in the Cape Peninsula.

The Scott frame will, we are sure, evoke unusual interest and comment.

The R.R. Spring Frame Mount.

Last week the Royal Ruby Cycle Co. submitted to the War Office a single-cylinder Royal Ruby-Jap spring-frame mount. This machine was originally described and illustrated, after a road test, in *The Motor Cycle* of February 3rd, 1916. A slightly modified design was reviewed in this journal of November 2nd last.

A Lewis machine gun outfit belonging to the Blackpool Squadron of the National Motor Volunteers—an instructive adjunct. Inset (left), Adjutant S. O. Taylor. Inset (right), Half-squadron Commandant J. Prestwich, to whom, with Commandant A. L. Parkinson, a sword has been presented by the N.C.O.'s and men



1

4

A Coast

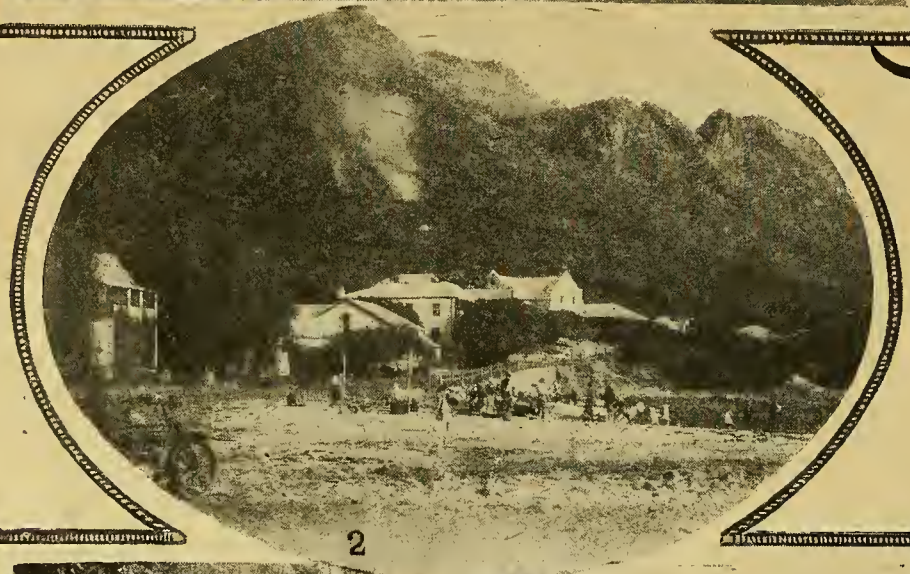
Cape

To many people the ment... the wild and lonely veldts ... neighbourhood of the coas... beauty, and consequently P... within easy reach, as our p...

No. 1 shows a bay christened "... be taken for the Orme's Head. ... a romantic spot, the Mecca of hor...

No. 3 is typical of South Africa, ... of motor cyclists. In the top cent... is exemplified, four of the machi... German East Africa being seated ...

A fine panorama showing the r... Hout Bay is shown in No. 5. "... photographer's New Hudson in th... only too requently encountered, ... spots of the Cape Peninsula—Cam...



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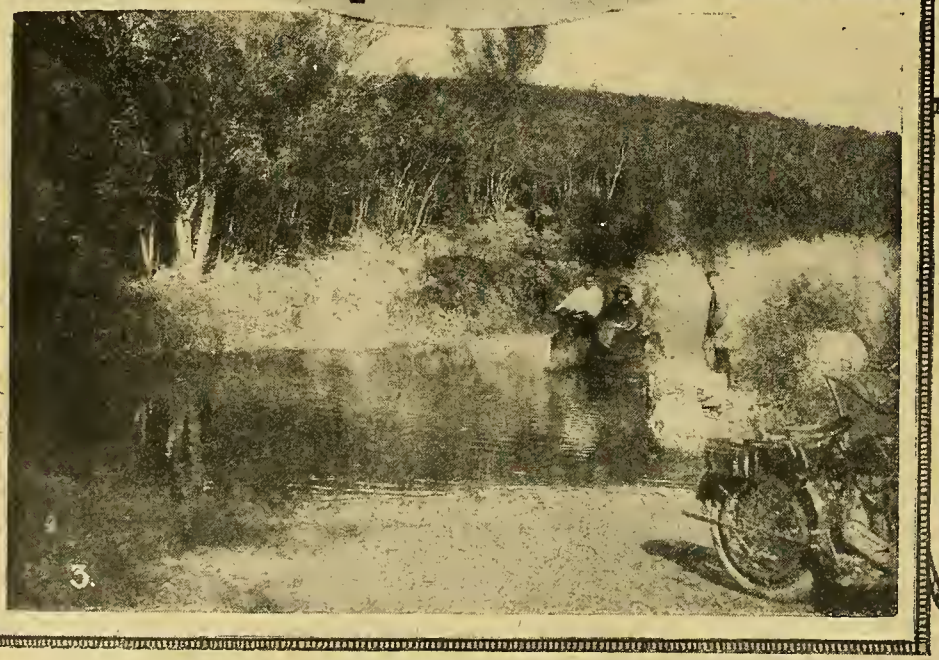


3.

5.

Ramble

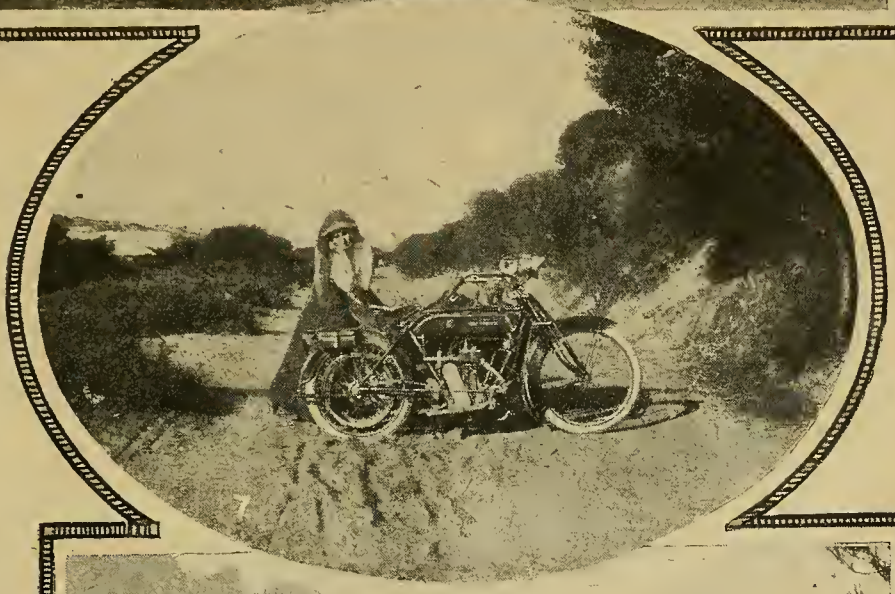
ninsula

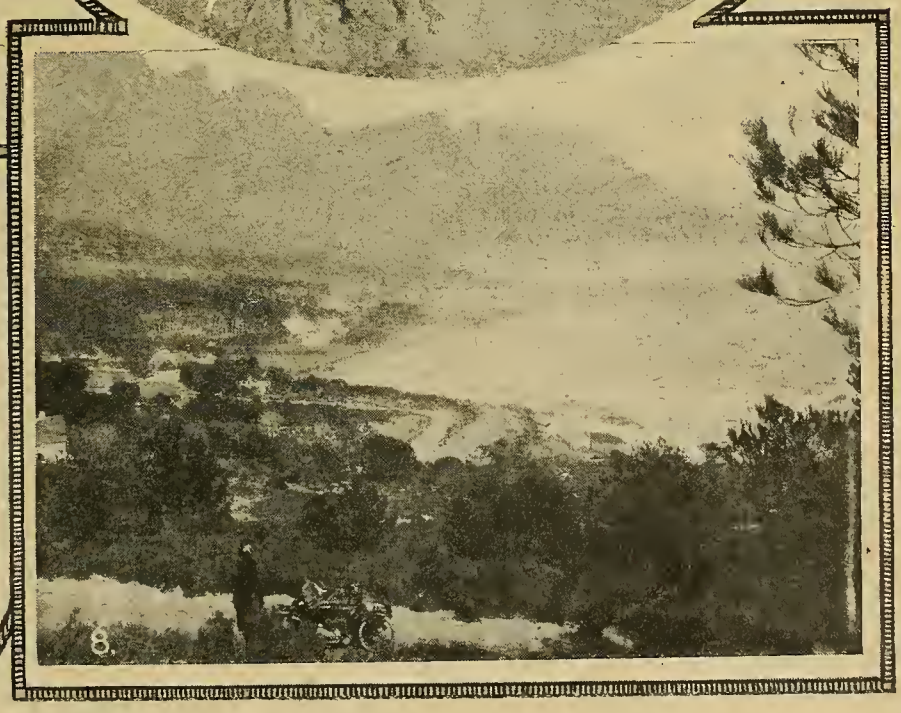
Africa recalls to the imagination late bergs and karroos. In the there are spots of unequalled r cyclists have many attractions estify.

on first glance the cliff might easily fishing village, Gorden Bay (No. 2), is

"splashes" being one of the bugbears opularity of New Hudson motor cycles of that make, wounded soldiers from

and peaceful seas in the direction of 3,000 feet) is seen in No. 6, with the lo. 7 shows the sandy roads which are epicts one of the most famous beauty





THE TERROR OF THE ROAD.

A Plea for the Revival of the Old Spirit.

IN the early days of the motor cycle its riders were recruited almost entirely from the ranks of ordinary cyclists who had developed a spirit of comradeship, which they brought with them into the new field. The result was that one motor cyclist was always ready to help another, and this spirit helped to make the pastime very attractive. In addition, the men of the new order were full of appreciation of the needs of riders of ordinary cycles; and even to-day it is easy to see that very many motor cyclists are recruits from the simpler pastime by the consideration they show their weaker brethren. Unfortunately, there is another element amongst motor cyclists, and their very obvious lack of consideration for other road users is likely to create a great deal of prejudice against a splendid recreation: there is a section which imagines that the possession of a machine driven by power automatically turns the motor cyclist into a being who has a right to ignore all others' rights. Perhaps one cannot do better than illustrate the two diametrically opposed types by an occurrence which is fresh in the mind of the writer:

The Two Types.

It was a peaceful Sunday morning, and standing at well-known cross roads leading out of the Metropolis was a motor cyclist contentedly smoking his cigar while waiting for his passengers to join him. Suddenly his attention was attracted by a fellow motorist approaching the cross roads, and knew that he was looking at an old cyclist when the newcomer slowed down to a walking pace on nearing the crossing, where, in ordinary times, many cyclists would have been found. Riding a lightweight, the motorist got halfway across, when the onlooker caught sight of a sidecar outfit coming at right angles at a furious pace, and reflected that the second man would have to moderate his speed. He was, however, wrong, for, with the lightweight more than halfway across the road, the driver of the combination neither slowed down nor passed at the back of the other machine, as he could have easily done, but simply jumped his engine to something in the neighbourhood of a mile a minute and endeavoured to swerve across in front of the lighter machine. The attempt might have succeeded, but there was not sufficient room, and the handle starter of the powerful combination hooked itself in the front wheel of the lightweight. What followed was truly sensational: the light machine, travelling at not more than four miles per hour, was suddenly switched off at right angles at a terrific speed and its rider shot up into the air, and then crashed down upon his head, unconscious.

Culpable Indifference.

The onlooker sped to his assistance, and was helped by passing cyclists, while the cause of the trouble, whose machine had not even been overturned, coolly watched them without attempting to do anything. Eventually he listened to repeated entreaties and went for a doctor, but it was forty minutes before the unconscious one could get medical attention. He was hurried off to a hospital, and it is understood that after a month of alternating consciousness and unconsciousness he awoke and remarked that he had had a "curious dream." But, and this is significant, the driver of the combination appears never to have even enquired whether the victim was dead or alive.

The incident demonstrates that a new element has entered the motor cycling world, and emphasises the need for strengthening the spirit of helpfulness and comradeship. If the evil spirit triumphs there will be an end of motor cycling as a pastime, and many thousands of people will have lost health-giving recreation; but we cannot but believe that the healthier spirit will be strong enough to exorcise the lower influence, and in that belief we look forward to the days that are coming. CORNUBIUS.

Beach Races in Christchurch, N.Z.

High Speeds on New Brighton Sands. Fastest Speed 67¼ m.p.h.

MOTOR cycle trials and races in the Dominions are apparently suffering in much the same way as they are over here, and very few events have taken place of late. The fact that so many of the leading lights of the various organising clubs have joined up is bound to affect the enthusiasm of those who remain, quite apart from any other motives or consideration. However, now and again race meetings are held, and recently the Pioneer Motor and Sports Club (N.Z.) held three beach races at New Brighton (Christchurch). The beach was very soft, and times might have been even better had the surface been more favourable. There were a large number of spectators to witness the events.

FIVE MILE MAIDEN SOLO HANDICAP.

Place.		Handicap.
1.	J. Mantell (3½ Triumph) ...	1m. 10s.
2.	W. Jones (7 Harley-Davidson)	scratch
3.	G. H S. Smith (3½ Swift) ...	1m. 40s.

Time, 5m. 20⅕s.; fastest time (W. Jones), 4m. 17⅖s. Won by abont 75 yards.

THIRTY MILE OPEN HANDICAP (SOLO).

Place.		Handicap.
1.	W. Jones (7 Harley-Davidson) ...	30s.
2.	F. Haworth (4 B.S.A.)	2m.
3.	H. S. Curtis (7 Indian) ...	1m. 30s.

Time, 26m. 46⅕s., which was also fastest time. Won by about 200 yards.

THIRTY MILE SIDECAR OPEN HANDICAP.

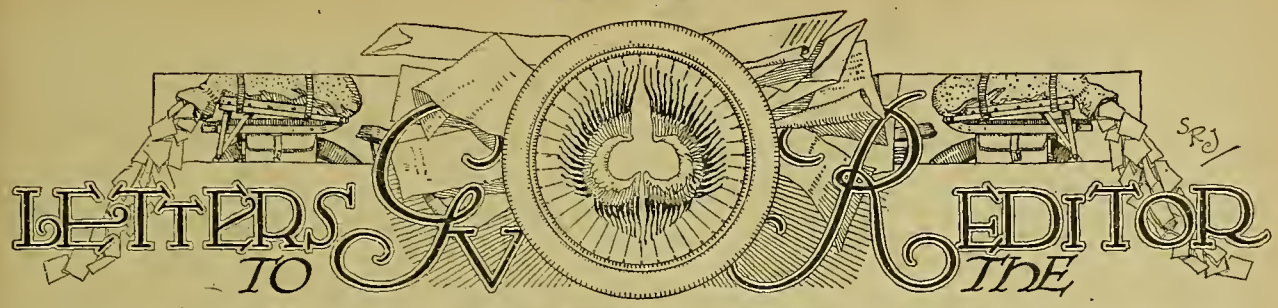
Place.		Handicap.
1.	F. Haworth (4 B.S.A.)	4m.
2.	G. B. Brown (4 Triumph) ...	4m. 30s.
3.	G. Moffatt (4 Triumph) ...	4m.

Time, 34m. 41⅕s.; fastest (W. Jones, 7 Harley-Davidson), 33m. 32⅕s. Won by two lengths.

On another occasion recently the same club held a beach race, also at Brighton Beach. On this day the beach was in better order, and the wind was more favourable. The race resulted:

1.	F. Haworth (4 B.S.A.)	4m.
2.	W. Jones (7 Harley-Davidson)	scratch
3.	G. B. Brown (4 Triumph) ...	5m.

Time, 51m. 46⅕s.; fastest time (W. Jones), 48m. 7⅕s. Won by 300 yards.



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

OUTSIDE FLYWHEELS.

Sir,—May we, through your columns, point out, for the interest of "A.H.S." and others, that we are quite certain of the improvement made by an outside flywheel on a 500 c.c. single, as compared with inside flywheels? We pin our faith to the outside flywheel, and have little doubt that public opinion will support us in this faith.

BURNEY AND BLACKBURNE, LTD.

BEARING PRESSURES AND LENGTH OF STROKE.

Sir,—The impression the "Long *v.* Short Stroke" controversy leaves on one lay mind is, "Six of one and half a dozen of the other." If Mr. Norton were to design and build a medium-stroke engine it would (one imagines) be little if at all inferior to his justly celebrated long stroke!

May one also thank Mr. Bradshaw for his patient, courteous, and lucid letters, and for all his efforts to help us laymen to realise the aims, difficulties, and methods of a progressive designer.

Few of your readers will be inclined to compliment Mr. de Lissa on his controversial methods; but (fortunately for its makers) the excellent M.A.G. engine speaks for itself.

Liverpool. H.K.P.

Sir,—The discussion on stroke proportions has been of great interest, covering as it does ground already well trodden by car designers. I submit that neither party can prove anything of value to either user or producer. To know the conditions imposed by the different proportions of stroke and connecting rod length is to provide for them. This is the art of the engineer.

Referring to car practice, we have cars of both types winners in road racing, and excellent from the users' point of view in respect of bearing wear. And we have others where the necessary allowance for loads has not been made and lubrication has been poor.

The latter is one of the secrets of success; splash will give way to positive in all motors. TILOP.

Liverpool.

SINGLE V. TWIN-CYLINDER ENGINES.

Sir,—I have just read another letter signed by Mr. Osborne de Lissa, who, I understand, is connected with the foreign (Swiss) made M.A.G. engine, criticising—in some cases sarcastically—the remarks of Mr. Bradshaw, the designer of the British-made flat twin A.B.C. engine. I believe, if the truth were known, it would be found that in the way of mechanical engineering Switzerland has done a very great deal for Hunland during the war. A single firm at Schaffhausen has delivered three hundred motors for Hun submarines; in fact, the latest information from Zurich confirms that a large number of workshops in Switzerland are working on behalf of the German Government. The Matchless previously fitted the foreign (Swiss) made engine indicated by the letters M.A.G., but they are fitting a 6 h.p. British-made flat twin on their post-war model, and quite right, too.

I have written this letter because one can buy a British-made engine which is as good as any foreign one.

Wimbledon Park. A.M.I.E.E.

Sir,—After a perusal of Mr. Granville Bradshaw's letter in your issue of January 25th I am convinced that we are really in agreement on the subject of induction pipe design, particularly as applied to horizontal twins. His mixture-heating experiments prove this. My original remarks on this subject applied to the horizontal twin engine as a type and the first half of his letter merely show that he alone of flat twin engine designers has realised the fact that long unheated induction pipes, as fitted to nine out of ten horizontal twins, are not a factor conducive to good running when the temperature is at a mid-winter level. The *argumentum ad hominem* regarding "hot sides" and intended sarcasm does not clear matters. To paraphrase the offending paragraph: "Can an engine be said to be uniformly cooled when two such dissimilar temperatures can exist 6in. apart in a mass of metal under running conditions?" Is there any objection to a completely exhaust-jacketed induction pipe for a flat twin engine?

A. LINDSAY, M.B., CAPT., R.A.M.C.

Sir,—I have no desire or intention to embroil myself in the discussion now rampant in your columns on the subject of "Flat Twins *v.* Singles." But I feel that a word from a rider of a big V twin is not entirely out of place. I have ridden, in the order given, a 3½ h.p. T.T., a 5 h.p. T.T. (an American), a 2¾ T.T., and I now possess an 8-10 h.p. V twin solo. The former three were in the "dear dead days before" the war, and the last a 1916 model.

In my humble opinion there is nothing to equal it. Certainly not any of the other three. One gets power, acceleration, no fuss, and, finally, speed. When throttled down on top the machine is delightful, and there is none of the jerk so noticeable at low speed on a single, geared high. The sole drawback is weight, but that is negligible when the other advantages are noticed.

What say your readers to the big twin? CE 1942.

London, E.C.

Sir,—May I be allowed to say a few words on the above subject? I have just read Mr. de Lissa's letter in your issue for December 14th, and I consider that he has allowed jealousy to overcome the courtesy due, not only to a fellow correspondent (Mr. Bradshaw), but also to *The Motor Cycle*. Let us have discussions, and well contested ones, but not those which assume a "hot" side (!) through jealousy.

Mr. de Lissa having entered the discussion brings with him the V twin, and this brings me to my questions. Will the V twin survive? Is the 500 c.c. "flat" twin going to oust the 500 c.c. V twin? Are our luxurious 770 c.c. and 998 c.c. sidecar outfits going to be flat twins in, say, 1918? I think so. Will Mr. Collier tell us why he dropped V twins (after remaining faithful to the type so long) in favour of the flat twin?

With regard to the single, I consider it will survive, and so will the flat twins Long and keen will be the struggle for supremacy. At the present time I do not think there is a man living who can say which will triumph. This I do think, the V twin will not be in at the death.

B.E.F. F. MASON, M.T., A.S.C.

Sir,—I am a regular reader of *The Motor Cycle*, and I think it more interesting to-day than ever it was. (Have taken it since first issue.)

Having had some years experience with motor cycles, I should like to express an opinion with regard to the discussion which has gone on for a considerable time in your columns. I used to be somewhat nervous about tackling a machine with a twin engine, thinking a "single" much more simple and economical. Perhaps my opinion would not have changed as it has done had I speculated in a less

reliable "combination" than a Harley-Davidson, which I have had since October last. This is fitted with disc wheels, which are extremely useful, especially when running through snow.

I have given this machine the most severe test which a machine *could* have (in this country), running through deep snow and over atrocious roads. A single would have been *absolutely* no use under the same conditions. The Harley-Davidson has killed all my prejudice against American machines, and I was very much prejudiced before having it. Of course, all American machines are not so good. I hear very poor accounts of some of them. Every part of my machine seems to have had much thought bestowed upon it. Take the clutch, for instance: I have never come across one which works so sweetly, unless it has been on a car.

The many refinements and wonderful reliability of the machine I have mentioned have made me seriously think that there is plenty of room for improvement in most British machines, and certainly more enterprise required by our makers, who *will* stick in one groove and make the excuse that reliability is their chief aim.

I admit that a comparatively low-powered "single" can get off the ground, solo, faster than most high-powered "twins," but I venture to say the average speed, with a substantial sidecar, for a day's run would be very much against the "single."

I will add the usual disclaimer with regard to Harley-Davidson motors. S. BARKER.

Sir,—Mr. Michelmore Hitchcock says a twin-cylinder machine gives double the trouble that a single gives. The plugs on my flat twin have very seldom sooted up. The engine very nearly seized at one time, but both cylinders were the same. Lately broken piston rings caused trouble, but there was one in each cylinder. It seems to me that where a part is duplicated they wear equally, and, I feel certain, not quicker than in a single.

I started up a well-known single of a late type, about 4 h.p., and gave it a short run. Up to about 10 m.p.h. it was jerky. Also it was stiffer than any flat twin I know to start, and it was impossible to make the back wheel turn round when engaged with the engine in low gear.

I have ridden over 2,000 miles on my present back tyre; a great deal with a pillion passenger, and the tread does not yet show signs of wear.

It is not so necessary to keep up the revolutions with a twin, as I have often turned a corner on top gear at 6 m.p.h. without a jerk and also picked up speed again, though I generally change down for that for the sake of the engine.

The use of the magneto advance lever will save changing down and undue wear when running slowly, and this seems a lever which many people leave in one position, viz., fully advanced. At slow speeds the force of the explosion comes before the piston reaches the top of the stroke. No wonder, then, that undue wear takes place.

London, S.W. R.E.C.

WATER INJECTION IN PETROL ENGINE.

Sir,—When I first enlisted I was working in the engine-house of our camp, and among the three engines we had was an old 16-20 h.p. Campbell, with water injection; this was partly for cooling and chiefly for preventing pre-ignition. If it was turned off for a time a most horrible knocking commenced, which stopped as soon as it was turned on again.

As for the chemical action, the action of water steam on red-hot iron (viz., parts of combustion head) would surely be to combine the metal with the oxygen and burn up the hydrogen. For a small and highly sensitive engine like a motor cycle engine water injection must be considered impracticable. (PTE.) W. E. SLEIGHT.

MUDGUARDING.

Sir,—I am always pleased to see letters, like that of Mr. Rycroft's in your issue of January 18th, on the question of mudguarding. This point, to my mind, is far more important than questions of carburetter warming, single *v.* twin controversies, etc. I, too, use a motor cycle daily for business purposes, and the last few weeks' weather has not improved my opinion of the manufacturers, who can supply us with engines like the M.A.G., gear boxes like the Sturmey-Archer, perfect clutches, interchangeable wheels, etc., and yet still continue to give us mud protectors unfit for a perambulator. I strongly object to clothing myself in fisherman's attire every time I must ride even a mile, and yet this is absolutely necessary unless one can afford a new suit every day (which is not absolutely war-time economy). Please keep constantly hammering this point home to manufacturers, as it is quite possible to make motor cycling as clean as motoring, if only the makers will try to produce sensible mudguards.

I would also like to see a guard right under the engine to protect the crank case from mud and dust (I believe the new Matchless is so fitted), and why could we not have metal guards on each side of the engine, to enclose the working parts entirely, leaving the front ends open for a current of air to pass between them on to the cylinders? We have still a lot to copy from the car makers in this respect.

There are thousands of potential riders, who at present look upon the pastime as a "filthy job," and until this bogey is laid will probably remain outside the ranks.

A. S BRADLEY.

AN ORIGINAL RACECOURSE.

Sir,—I am enclosing a photograph illustrating an odd motor cycle race which was staged near here recently by Paul J. C. Derkum and R. C. Obert.

The race was run through the five and a half mile length of the big concrete storm drain at El Molino. Obert won the race, covering the distance in 9m. 18⅘s. Derkum's time was 11m. flat.

The running time was increased considerably by the fact that two miles of the distance was over a cobblestone surface, and the last three miles was through soft mud and water

A race in a storm pipe. (See letter from J. E. Hogg.)

from 3in. to 6in. deep. The drain also has numerous curves, and in taking one of these at high speed Derkum charged the wall, due to a skid (a side-slip, I believe, is what you call it in England). He lost two minutes straightening his handle-bars.

The picture shows the riders neck and neck coming down one of the several water shoots in the course of the big drain.

While this race was a thriller from start to finish, the most remarkable part of it is that Obert won in spite of the fact

that he used a Cleveland lightweight motor cycle, while his opponent used an Indian motor cycle of much greater power. Obert's success is attributed to his ability to handle the little machine on the curves and in the slippery mud and water.

Alhambra, Cal. JOHN EDWIN HOGG.

HEATING THE CARBURETTER.

Sir,—Having read Mr. H. H. Brownrigg's very interesting letter in your issue of January 18th, stating his experiences in connection with heating the air drawn into the main intake of the carburetter of his 4¼ h.p. single cylinder, I should like to give my opinion as to the cause of loss of power and overheating which resulted from the above proceeding.

When air is heated and consequently rarefied and drawn through the main intake, the pressure at the jet orifice is lessened, with the result that more petrol is sucked into the combustion chamber, giving an over rich mixture. Also, the mixture not being of so dense a consistency as cold vapour, cannot be compressed to so great an extent, naturally causing loss of power. Apparently the only solution of the problem seems to be to heat the mixture while on its passage from the jet to the cylinder, to overcome the over rich predicament; but a certain loss of power seems inevitable. GEO. SCOTHERN.

STARTING ON ACETYLENE.

Sir,—There is a small paragraph in *The Motor Cycle* of January 25th which is of vital importance to my Starter jet, that is, a little piece in "Current Chat," page 75, *warning* motorists not to use acetylene gas for starting internal combustion engines. The warning is given by an experienced chemist, who states that all who escape accident when using this system do so by good luck, so evidently I have been enjoying extraordinarily good luck for the past two years. I might say that a Daimler started up O.K., but I should like to give it a good trial. If you do not hear much of me later on, of course you will know myself and friends, present at the time of starting up, have gone hence owing to *accident*. H. G. PASSEY.

Sir,—I see you have a short article in *The Motor Cycle* of January 18th on starting with acteylene, and apparently it receives more or less approval from you.

May I point out the very dangerous character of any such contrivance? I do not in any way question the results said to be obtained, but I am surprised the author of them is still unharmed, and especially so with regard to his machine. The idea is quite old, and has been done with various internal combustion engines, sometimes with, at any rate temporary, success; in others, alas! with accidents, some ending fatally.

The point has only just been raised again in *The Model Engineer* by one who, like your correspondent, tried it. With the marvellous "luck of ignorance" he had not then had any accident; but another reader described a case ending fatally. The least extra accumulation of gas is fairly certain to blow the cylinder off. It cannot be too strongly insisted upon that acetylene, in any case, is a dangerous substance to use as an explosive, and in the case of anyone not an expert in mechanical chemistry it is sheer folly to meddle with it.

Perhaps you are aware that acteylene and oxygen (as opposed to air) is so violently explosive that, even in these days of high explosives (and before the Defence of the Realm Act), the *making* of the mixture is forbidden by law, let alone any attempt to use it.

I myself can claim to be a highly trained and experienced chemist, and somewhat of a mechanic, and I would not on any consideration allow acetylene to be used in any case where I might be able to prevent it. F. C. LEES.

MEASURING GRADIENTS.

Sir,—I see in *The Motor Cycle* for January 18th that the question of measuring gradients has cropped up again. There appears to be a great deal of misconception about this, and, as a railway engineer, it is news to me to learn that on a railway a gradient of 1 in 1 is vertical.

On all engineering works, as I know them, distance is measured truly level; anything else would lead to endless confusion, and it would be impossible to represent a plan on a flat surface. On a railway, where the gradients are usually very flat, the difference in length measured on the rail as against a level length is so trifling that it need not be taken into account in actual practice, but this does not apply in the case of hilly roads.

To produce a profile or section showing the gradients on such a hill as Sutton Bank is quite a troublesome business, as the length of the surface of the road is considerably greater than that taken on the level, and it is the level, or horizontal, length that is required as against the vertical rise in that distance. This denotes the gradient, the surface length not being considered at all. S.L.

Doncaster.

PORT DESIGN ON TWO-STROKE ENGINES.

Sir,—I greatly appreciate "Progressive's" article on two-strokes, and quite agree with his list of merits, but could add another, lightness. As he says, most of the disadvantages have been overcome in most of the good makes. My experience will bear out this statement.

I have owned and driven several well-known two-strokes, also four-strokes, but for an inexpensive lightweight, cheap to run, light on tyres, belts, and petrol, there is nothing to beat a two-stroke.

I have used my machines almost every day, both for business in town and touring, having several times done 130 miles a day on a Baby Levis. My present bicycle is a 1915 Excelsior, Villiers two-speed engine, chain-cum-belt drive, Amac with 26 jet and a large compression tap in induction pipe, which is fully open after starting from cold. I have fitted a 1½in. tail pipe to the silencer, which has improved the running.

The machine will easily climb hills like Sunrising, Fish Hill (Broadway), Weatheroak, etc., on top (5¼ to 1).

With regard to the disadvantages mentioned by "Progressive," I will give my experience with this machine.

Flexibility.—I can ride, with person walking, on bottom gear (8½ to 1), ignition retarded, and accelerate to 40 m.p.h. on top. A four-stroke of the same size is no better, if as good. It rarely four-strokes.

Cooling.—I have had no trouble on this score. I give plenty of oil (drip to induction pipe). I often do sixteen miles, Alcester to home, including climb up Gorcot Hill, in thirty minutes, and the engine is not really hot on arrival home. I had some trouble at first with plugs, but since fitting a Sphinx speed model my troubles have departed. I am going to try the new Sphinx two-stroke plug next time.

Petrol Consumption.—About 100 m.p.g. is my average.

There has been no trouble with crank case compression. The original bearings are still as new after about 8,000 miles, also original piston rings are still running. They never stick in their grooves, as I think I keep them free by injecting a drop of paraffin once a week into the engine while hot. I clean and decarbonise about every 500 miles, which only takes about an hour (a big advantage over four-strokes).

For a rider who is content with a 25-30 m.p.h. pace there is nothing to beat a good two-stroke.

In conclusion, I should like to say that I consider the Excelsior a grand machine, well built, nothing shoddy, compact, and pleasing to the eye. Usual disclaimer.

King's Heath. EXCELSIOR.

A TIP FOR EASY STARTING.

Sir,—In spite of the general easy starting of the 2¾ h.p. Douglas, much difficulty has been experienced during the cold weather in starting up from cold in this part of the country (Newcastle-on-Tyne).

The following tip has been found of great service, and is passed on to others who are riding the W.D. Douglas. Remove the projecting tronser guard on the air intake of the carburetter, and do not refit until warmer days arrive.

Purchase a good-sized cork from an oil and paint merchant, and cut it to the shape of the screwed cover of the air intake, and make a close fit to prevent it slipping off on to the road. On the coldest morning all one need do is to slip this fitting on, tickle the carburetter, a good heave, and off it goes. After mounting, the cork can be removed and put in the pocket.

WILL B. DAVISON (Sgt. D.R.)

[*Owing to the large number of interesting letters received weekly, many have to be held over for want of space. Correspondents are therefore asked to be brief and to the point.*—ED.]

CAM DESIGN.

A Dissertation upon Cams, showing the Reasons for Different Contours. and the Advantages and Disadvantages of the Various Types.

WHILE most people, or, at any rate, most motor cyclists, have an idea of what a cam is, and what function it is supposed to perform, very few probably have troubled to analyse the action of a cam, its whys and wherefores, and so fail to understand why one engine has quiet valves and another the reverse. Also, it is not generally appreciated why one cam wears rapidly, another slowly; why one is suitable for speed work, yet another for touring and slow pulling.

The writer proposes to explain these various points. Fig. 1 shows a cam, tappet, and valve such as would be a common arrangement on any motor engine. In the end of the tappet is a roller, which rests on the face of the cam. In many engines this roller is replaced by a rocker lever as shown in fig. 2, but for our purpose we will use the roller. Having now the mechanism, we must next consider the motions we can impart to it by rotating the cam.

Fig. 1.—Valve arrangement with a roller tappet.

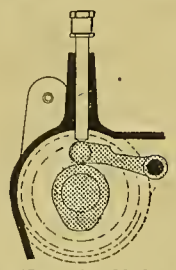


Fig. 2.—Valve gear, showing rocker lever.

There are three distinct motions, any of which, or any combination of which, can be transferred to the roller. Movement of the roller, of course, means that the whole mechanism moves, so I will use the word roller throughout. Now we can consider the three distinct motions mentioned. They are—

1. Uniform Motion.

This is where the roller, having once been started, is lifted a uniform amount for each stage of revolution of the cam. Any object which is travelling at a constant speed, such as one mile in one minute continuously, is travelling with a uniform motion. We must note, however, that in order to travel with a uniform motion, the object must already be in a state of motion. A body which is in a state of rest cannot instantly attain uniform motion. This point is of very great importance, as will be presently shown.

2. Harmonic Motion.

The next type of motion is called harmonic motion. A familiar example of this is approximately the motion of a piston attached by the connecting rod to its crank pin. The piston is brought to a stop by the connecting rod at each end of its stroke, and is reversed, gradually gaining and then losing speed. The projected lines on the diagram (fig. 3) show this more clearly than can be explained.

3. Constant Acceleration and Retardation.

When a body is moved with a constant acceleration, we mean a constant and unvarying force is applied to it. Thus, when the body is still, and offers its greatest resistance to motion, force is applied to it and moves it slowly. The resistance to motion thus decreases, and with the same force applied the speed of the body increases constantly. *Vice versâ*, if we desire to stop the body, a constant force will cause it to stop without shock by retarding it gradually.

Having now fully considered the motions we may employ, I will next revert to their applications, in practice, to cams. My intention is not to confuse the reader with strings of figures, but to endeavour to show how the cams are designed, and what the effect of each will be on the roller. This, I consider, is best done in a graphic form, in which the roller is shown as if it were rotating around the cam. It will be noted, however, that the positions of the centre of the roller during a certain stage of its lift are projected on to a vertical line to make my comparisons clearer. The cams, which are shown at figs. 4, 5, and 6, have been drawn from the following data.

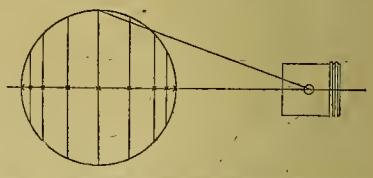


Fig. 3.—Diagram explaining the harmonic motion of a piston.

Valve lift = .4in.
Valve to be lifted in 90° crankshaft rotation.
Valve to remain open for 40° crankshaft rotation.
Valve to be closed in 90° crankshaft rotation.
Diameter of roller = ½in.

Uniform Motion.

The cam, of course, runs at half engine speed, therefore the angle of crankshaft rotation must be divided by two to give the corresponding cam period.

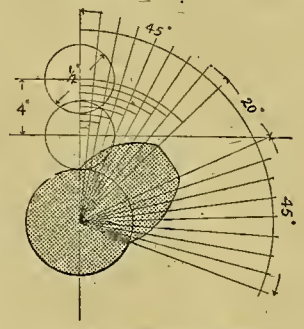


Fig. 4.—Uniform motion.

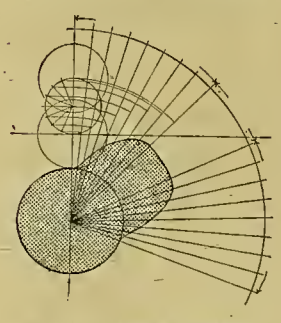


Fig. 5.—Harmonic motion.

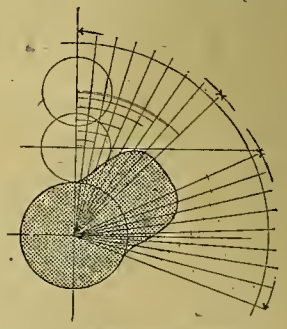


Fig. 6.—Constant acceleration.

Cam Design.—

This is shown on the diagram, the angles being then 45°, 20°, and 45° respectively. From the position where the roller rests on the plain portion of the cam we mark off the centre of the roller. Above this we step off the lift of the cam, viz., .4in. This space can be divided into as many portions as convenient, eight having been chosen in this case. We must remember, however, to divide the angle through which the lift occurs into a similar number of parts. From the cam centre of rotation, the different centres of the roller are projected across as shown.

To obtain uniform motion the roller, having no initial upward motion, must accelerate from nothing to the velocity it has to attain finally in an infinite space of time. This is impossible, and what would occur actually would be that the roller, on coming in contact with the cam face, would attempt to bounce off immediately, then would fly back again, and so on, causing great shock, noise, and wear. As we want the roller to be lifted with the minimum effort, it is clear this cam does not suit our purpose.

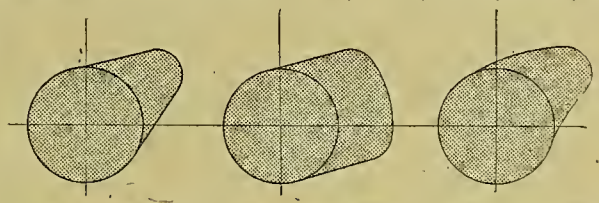


Fig. 7.—A type of tangential cam useful for all-round work

Fig. 8.—An alternative type of tangential cam.

Fig 9.—A cam primarily designed for speed work.

An illustration of this occurring may be helpful. Supposing a motor cyclist moving along at, say, 30 m.p.h. runs into a wall. The impact is terrific, of course, and breaks his machine. This is almost equivalent to what occurs to a roller in the case given. Supposing, now, our motor cyclist uses a constant retarding force, *e.g.*, the brake, he stops himself without damage. This gives a rough illustration of the difference between the action of the uniform motion and constant acceleration cams.

In the case of harmonic motion, shown in fig. 5, as can be seen at a glance, the upward lift of the roller is much more gradual than in fig. 4.

Constant Acceleration.

The most important type of cam, viz., constant acceleration and retardation, is shown in fig. 6. I say this cam is the most important, because it is possible, by its use, to raise and lower the roller with practically a constant force being exerted by the cam. This is a highly important feature, and one upon which too much stress cannot be laid. It means that we can obtain a quiet, durable valve gear which will maintain its original efficiency for long periods. We note on the diagram how the roller is first lifted a small amount, increasing to the middle of the lift, and then decreasing to the top of the lift, thus doing away with the tendency of the roller to fly off the cam face.

Other Cams.

The remaining diagrams, figs. 7, 8, and 9, show three more types of cam. The first two are varieties called tangential cams. This type, especially the first, gives, as can be seen by comparison with fig. 6, a very close approximation to constant acceleration, and, when properly designed, gives very good results. It is largely used owing to the simple outline lending itself well to cheap machining. The last is a type which gives very good results for speed work, but is noisy, and usually unsuitable for touring engines. As can be seen, it gives a rapid opening to the valves, which, combined with an equally quick closing, permits a long dwell open.

Summary and Remarks.

The writer is firmly of opinion that a study by designers of the essentials of cam design would benefit many motor cycle engines. Noisy valve gear is, without a doubt, very much more prevalent on motor cycle engines than on car engines. It is acknowledged, of course, that car engine designers were very much stimulated by the advent of the sleeve valve engine, but there is no reason why motor cycle engine designers should not also improve their products. Noisy valve gear has usually been in the past drowned by a more noisy exhaust, but, as silencers improve, more insistent demand will be made for silent valve gear.

By the foregoing the writer hopes some of the faults and ideals of cam design are made clear, and a little consideration of this article will help to make the reader appreciate the reasons underlying valve gear behaviour.

A.A.S.

Radiating Fins and Aero Engine Practice.

WE have often made reference to the probable influence which aeroplane engine construction is likely to have on the motor bicycle engine of the future, and some little while ago published a series of articles on this interesting subject. Since that time further evidence has been forthcoming that vast strides are being made in moulding and casting, so that now it is possible to cast the most intricate cylinders with twice as many radiating fins per foot as was before commercially possible.

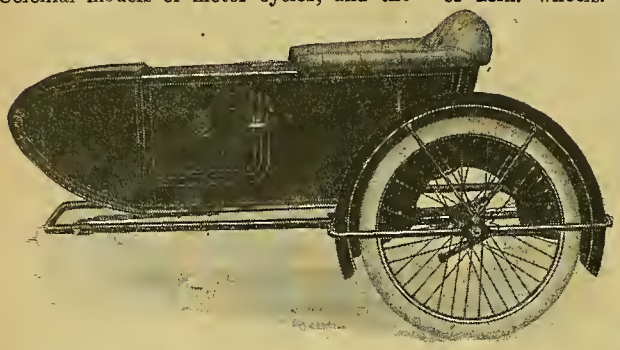
Moulding and casting, where it depends entirely upon the adroitness of the craftsman, enables practically anything to be cast, and the writer has seen the most beautiful designs in foliage, flowers, etc., produced entirely in cast iron, but the methods employed are very different from ordinary foundry work. To produce motor cycle air-cooled cylinders on these lines would be extremely expensive.

From what we have seen we think it is quite probable that motor cycle cylinders will in future not only be cast very much better than ever they have been before, but they will also be cheaper to produce as well as more uniform throughout. Previous to the production of aeroplane cylinders with a large number of radiating ribs set very close together, the ordinary motor cycle cylinder produced a considerable amount of bad language among founders. The aeroplane industry has, however, produced machinery by means of which there does not appear to be any difficulty in moulding and casting air-cooled cylinders with as many ribs as can be got on the barrel. The ribs can also be as deep as before and very much thinner at the edge and the root.

SIDECAR DEVELOPMENTS FOR EXPORT.

A Special Design to Meet Overseas Requirements.

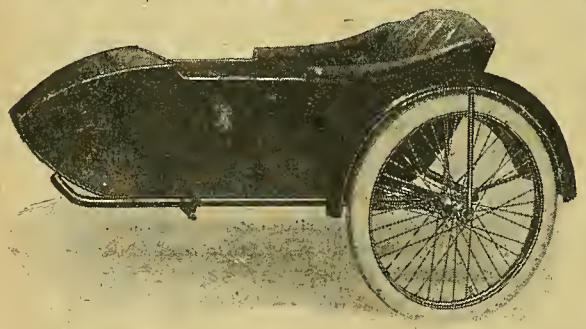
IN furthering our campaign to foster the export trade of this country, we continue to find manufacturers devoting what little time they can spare from war work to the important duty of holding our Overseas markets. Many firms have specialised, from time to time, in Colonial models of motor cycles, and the return of peace will see a marked advance in this direction; but the sidecar, developed in accordance with the many urgent demands from all parts of the world, has been somewhat neglected.



The Empire military model, which is specially designed for Overseas use, having a 12in. ground clearance. Note the six-point fixing of the mudguard.

Messrs. Lowes Empire Motor and Sidecar Co., Ltd., of 159, Great Charles Street, Birmingham, have been concentrating on Overseas models—or rather on special sidecars to meet War Office requirements for active service. This has necessitated the design of a model which will "fill the bill" for the majority of Overseas riders. In order to obtain the ample ground clearance of 12in., the usual type of underslung frame is superseded by a level chassis of extra heavy gauge tubing. Four-point heavy steel forged connections are provided, each embodying a patent quickly detachable coupling. The wheel is exceptionally strong, being built on an unusually wide hub, supported at both ends with heavy gauge spokes. The steel mudguard has a deep inside valance, and is attached at six points; this should effectually prevent the usual destruction by vibration, common with guards having inside supports only. Removal of the wheel is rendered easy by slotted fork ends. Springing is strong yet efficient, the connections to the chassis being a particularly good point.

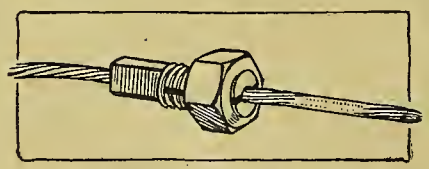
A coachbuilt body on pleasing lines, made up of close annealed metal panels on wood frames, made under a patent process, finished with good upholstery, side doors, and pockets, all go to form a smart and attractive sidecar. A neat screen can be provided if required. A substantial kick-up jack is fitted. This model can be supplied with either 26in. or 28in. wheels. We are informed that numbers of this particular model have seen active service on all fronts, and have given general satisfaction. The makers have, amongst a long list of various designs, one or two other types especially worthy of notice. The Empire lightweight, which turns the scales at about 60 lb., is a very pleasing model, as is also a medium weight, built on similar lines. This has a special point in an extension of the wheel spindle, which carries an outside vertical support for the mudguard, pivoted at the top to lift out of the way when removing the wheel.



A medium weight Empire model, having an outside stiffening rod pivoted to the mudguard.

A NEW BOWDEN WIRE NIPPLE.

THE ingenious nipple for Bowden wires we illustrate can be attached instantly. The end of the wire is first sweated to prevent the edges fraying. The nipple has the ends split and coned, and the fact of screwing a nut over the split cone ensures a tight grip of the nipple. Once the end has been sweated and the nipple placed in position, the wire can be shortened or adjusted without any necessity for further soldering.



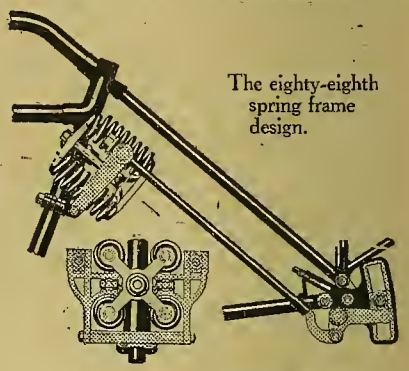
A wire nipple by which the length of cable can be easily adjusted once the end has been soldered.

The device is the invention of one of the mechanics at Messrs. H. Taylor and Co.'s, 21a, Store Street, Tottenham Court Road, London, W.C., who is anxious to sell the rights of manufacture.

REAR SPRINGING.

THE Motor Cycle campaign in favour of spring frames is well known to our readers, and we illustrate on this page a device invented and patented by Mr. M. M. Brophy, of 48, Approach Road, Margate.

The rear axle carries blocks, which slide in slots carried at the rear of the forks, and capable of adjustment for chain or belt stretch. The wheel axle is mounted upon the longer arms of the bell crank levers, while the shorter arms are connected with springs and placed in such a position with relation to the direction in which they act upon the springs that any upward movement of the wheel will tend to move the ends of the short arms appreciably towards the fulcrum of the lever, so that they, acting through a shorter leverage, will have a more powerful influence upon the springs as they are compressed, and their resistance of the latter increases. Thus, it is claimed, bouncing is minimised, and a very delicate adjustment obtained. Reference to the illustration will give a clear idea of the construction of the device.



The eighty-eighth spring frame design.

A rear springing device patented by M. M. Brophy.

"Motor Cycles and How to Manage Them."

Recognised everywhere as the standard handbook on the motor cycle, its care and management. Every motor cyclist, whether beginner or experienced rider, will find the book extremely useful.

Price 1/6 net. By post, 1/10.

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This book gives hundreds of useful "wrinkles" and items of information concerning the running, management, and repair of motor cycles, and contains what may be termed the cream of up-to-date motor cycling knowledge. Altogether nearly 1,000 hints and tips are given.

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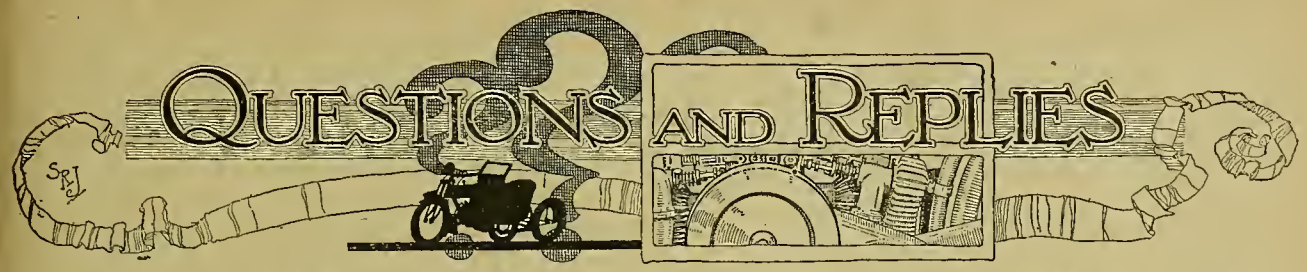
The object of this book is to enable motor cyclists not only quickly to trace the cause of any fault in the machine, but to remedy the trouble in the shortest possible time. The system is applicable to all makes of machines, both four-stroke and two-stroke.

Price 1/- net. By post, 1/2.

Obtainable through leading booksellers, or direct from the publishing offices of "The Motor Cycle," 20, Tudor Street, London, E.C., England.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C., and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Again—Which Wheel Lifts?

Owing to an argument that has arisen among the despatch riders of my company, I should esteem it a great favour if you will give me your opinion as to which turning, right or left, one is most likely to turn a motor cycle over when riding with the sidecar attached.—F.C.B.

With the sidecar on the left-hand side of the machine you are likely to overturn the outfit in taking a left turn. In taking a right turn it is almost impossible to upset, the wheels of the outfit merely skidding. With any vehicle the wheel or wheels on the *inside* of the circle tend to lift when cornering at speed.

Broken Valves.

I have a motor cycle fitted with a 2¾ h.p. single-cylinder engine, on which the exhaust valve is continually breaking. I do not think the valve spring is too strong, but I cannot get a valve to last more than 500 miles.—D.L.W.

Your trouble is most likely due to the valves being made of poor material. Have a special valve made of nickel or tungsten steel. The following will often cause valves to break: Too rich a mixture, back pressure in exhaust outlet, running with spark too far retarded, or too strong a valve spring.

Difficult Starting.

I should be much obliged if you could advise me in the following difficulty. I ride a 2¾ h.p. Douglas, 1913 model, fitted with 1916 cylinders, and Binks 1916 three-jet carburetter. I have rung the changes on various pilot jets, and find that when running the correct ones are 000 and 2, as first and second pilots. The trouble is to get the machine to start. After flooding the machine gives a few more or less feeble explosions and then stops. If I open the throttle more than half on to the first pilot it chokes. I used to start up by putting my hand over the air intake, but as I have fitted a hot air pipe, without which the float chamber promptly freezes up, this is now impossible.—J.C.

We think you will get easier starting if you proceed as follows: Make quite sure no air leaks exist in the induction pipe or the carburetter joints, and make certain the contact points are breaking properly and are quite clean, and plugs are in good order, and electrodes are clean and properly adjusted. If all these points are correct start as follows: Before flooding, open the throttle wide so that petrol sprays from all three jets simultaneously. After flooding freely, close the throttle so that the pilot jet only is in action. We think if you try this tip you will be able to start more easily, though, of course, starting difficulties are to be expected in cold weather with present day petrol.

Tuning a Scott.

Will you kindly assist me with your advice *re* 1914 Scott? The machine is in excellent condition, compression in both cylinders perfect, and quite clean internally; magneto timed, when retarded, points broken, piston dead on top. I have fitted new gauzes and crank case packings. The machine is very heavy on petrol—30 to 40 m.p.g.—and does not climb hills on top gear solo, also cannot exceed 35 to 40 m.p.h. (1.) Is it quite necessary to have double gauze to all four transfer ports? (2.) What speed should the machine be capable of, solo and with sidecar? (3.) Is the Scott machine suitable for long journeys with sidecar, passengers' total weight 25 stone?—G.G.

(1.) We do not consider it absolutely necessary to have two double gauzes in each of the transfer ports of the Scott engine. You will find that the gauzes can be separated, and we would advise you to do this and replace them with only one gauze between each of the packing joints. This is particularly advisable when using heavy fuels, which show a tendency to fill up the gauzes with a black glutinous substance. We would imagine that obstruction in these gauzes is probably the cause of your machine being slow on the road, but a Scott never pulls well after having been decarbonised till it has done a certain amount of running. (2.) It is rather difficult to say what speeds the machine should be capable of. It should touch something in the neighbourhood of fifty solo, and forty with a medium weight sidecar, in the hands of a mediocre rider. (3.) Yes, we consider the Scott machine quite suitable for long journeys with sidecar. Being water-cooled, it can carry a fair weight at high average speed without danger of overheating. We note that you have fitted new packings to the crank case. We presume you mean the rubber packings between the cylinders and the crank case. Very great care is needed in making these joints, as the slightest inequality, caused by the twisting of the rubber rings, will entirely upset the running of this engine. Make careful search for air leaks, both about the crank case and the induction pipe.

A Weak Spark.

I have a small Bosch magneto which I can only get to spark by moving the high-tension wire across the field magnets. It will not jump across anything. I have tried altering the size of the gap, but to no purpose. Would you please advise me what to do to make it spark across the points of a plug?—A.W.W.

Make sure all adjustments of the magnets are in order. See that the rocker arm of the contact breaker is not sticking, and that the platinum points are clean and adjusted to break about .4 mm. Also make sure the high-tension carbon brush and holder are in good order and free from oil. See that the switch wire, if fitted, is not shorting. If all these points are in order, it is possible the magneto may require an overhaul or the magnets remagnetising. When rotated fairly fast—say at about 200 r.p.m.—a spark should take place at the plug points quite regularly and jump a gap of about 1 mm. In testing, see that only the body of the plug is touching the metal of the engine or magnets.

Gummy Engine.

(1.) I have a 2¾ h.p. two-stroke, the engine of which gums and locks when running to make a start, the back wheel skids, and on tar macadam it is almost impossible to start. Injecting a quantity of petrol eases the engine, but even then it sticks when starting again. I bought it second-hand; it is about twelve months old. Can you suggest a remedy? (2.) What is the best oil for this type of engine, and the best setting of the drip lubricator, as I have been used to an oil pump?—J.M.

(1.) The exceptional gumminess of your engine may be due to faulty piston rings. Either the rings are too large or are stuck into their grooves. You may be using an oil which is too thick for the cold weather. (2.) Any first-class brand of oil of a light grade, such as Price's, Huile de Luxe, or Vacuum T.T., should be about right. You may possibly experience less difficulty in starting if you give only a very small throttle opening for starting. The correct setting for the drip feed can only be found by experiment, as it varies according to the work being done. Sufficient oil should be given to cause the engine to be almost smoking, but not quite; that is, if the throttle be closed or the engine shut off while descending an incline, upon opening out again a puff of blue smoke from the exhaust should be visible.

Desaxe Cylinders.

I shall be much obliged if you can see your way to answering the following questions: (1) What are the mechanical and theoretical advantages and disadvantages of an "offset" or *désaxè* cylinder? (2.). The *actual position* of the crank pin in relation to the main shaft and gudgeon pin at the moment of the "piston on dead top of the stroke." (3.) Is the balancing of this type of engine any more complicated or difficult?—A.S.

(1.) The chief advantage claimed for an offset or *désaxé* cylinder is that a more direct thrust on the crank pin is obtained; there is also less thrust on the cylinder walls during the explosion stroke. In practice the difference noticeable is small. (2.) When the piston is at the top of its stroke the connecting rod and crank will be in line, and the crank pin will have passed the top vertical position and, in fact, commenced to descend. (3.) The balancing is practically the same as with the cylinder in the usual position, for the amount of offset is never great.

Refusal to Fire on Front Cylinder.

I have been troubled with missing and erratic firing of the front cylinder of my "flat twin." This cylinder will not fire at starting, but after running a few minutes on bottom gear will suddenly pick up until I change into top, then it will again commence to miss. The same thing happens when, after firing regularly, I have to slow down for corners; on opening the throttle it again misses. I may add I am using a Binks three-jet carburetter, and the engine seems to pick up only when opening the throttle fully. I have tested the plugs, valves, tappets, clearance, magneto adjustment, etc., and can find no air leaks. This trouble has puzzled some good mechanics, and if you can let me have your opinion you will greatly oblige.—A.H.L.

We think you must have overlooked some small misadjustment. It sounds very much as though you have an air leak somewhere which affects the front cylinder. A very likely cause is a badly worn inlet valve guide, through which air can be drawn. Weak inlet or exhaust springs might also cause the trouble. If these two points do not prove to be the fault, we can only advise you again to go over all ordinary adjustments; bind all induction pipe joints with adhesive tape to prevent air leaks, make sure that the magneto carbon brushes and holders are in good order, that the insulation of the high-tension cable is quite sound, and make sure the contact points are breaking equally for both cylinders. Uneven lubrication of the cylinders might cause poor running on the starved cylinder, but this is not a likely cause. Whether the fault is in the plugs can be seen by changing the plugs over. See that the air is heated before it enters the carburetter. An improvement may also be effected by lagging the inlet pipe, as condensation often causes erratic running during the cold winter weather. The trouble of poor acceleration is undoubtedly due either to incorrect combination of jets in the carburetter, or to air leaks somewhere in the induction system. For information on the matter of carburetter adjustment we would advise you to write to the makers of the carburetter.

Misfiring.

Would you be good enough to let me know what you think is wrong with my magneto, which is a Ruthardt? The engine misfires badly, from what cause I cannot say, although I have had a motor cycle for five years, and have referred to "Motor Cycles and How to Manage Them." It fires perfectly six times, and then misses about the sixth as regularly as if it were made to fire that way. The points are good and the adjustment correct, the magnet powerful, and the carbon brushes all right. I should send it to be repaired, but I use the machine nearly every day, and from what I hear the makers might keep it for months.—T.B.

From what you say in your letter there seems to be no evidence at all that it is the magneto which is at fault. We should recommend you to overhaul the whole machine, especially the carburetter, which may after all be the source of the trouble. Detach the high-tension wire from the magneto and hold it close to the cylinder, rotating the engine at the same time, and if a spark occurs regularly you may be sure that the magneto is in good order. Make sure that the contact breaker rocker arm is not sticking. Symptoms such as you describe, as you are aware, may be caused by worn throttle slides, air leaks in the carburetter or induction pipe unions, and weak exhaust valve springs. If you definitely trace the trouble to the magneto, all you can do is to send it to the makers or some reliable repairers.

Overhauling.

I have a 3½ h.p. single, and have taken the engine down, and on the spindle each side the flywheels there appears to have been a small peg for the ball bearing cage to fit on, but these have worn or broken off. (1.) Would it be advisable to have them put in again? (2.) Would there be any harm in mixing a small amount of graphite with the engine oil when I put the engine together? (3.) Should there be a small hole in the petrol filler cap? (4.) The oil comes rather freely through the auxiliary exhaust valve down the pipe, and clogs the small holes in the silencer. Can I alter this? (5.) The oil also comes up the tappet guides and through the ball valve on the pulley side. (6.) The engine has a tendency to knock. I have two sparking plugs, one with three points and one with four.—L.B.

(1.) Yes; we should advise you to peg in the ball bearings, as previously done, otherwise they may turn and wear the crank case. (2.) We would not advise you to use graphite. (3.) Yes; there should be a small hole in the petrol filler cap to enable the petrol to flow freely, otherwise the tank will become air-locked. (4.) You might cure this by fitting a stronger spring. (5.) If there is much leakage of oil at the tappet guides, new guides are probably necessary. The ball valve might have a pipe fixed on the end of it, so as to carry away any excess of oil which leaks at this point. Possibly you are giving too much oil. (6.) You do not give us sufficient details to enable us to tell you the cause of the knocking. This may be due to too much carbon deposit, to a loose gudgeon pin or big end bearing, or to the use of a plug the points of which are too light and cause pre-ignition. It is best to use a good single or double point plug of first-class manufacture.

A Gastight Joint.

(1.) My 6 h.p. A.J.S. has detachable cylinder heads, and on sending to the makers for jointing they sent me a copper washer. Is it intended to have a bit of asbestos cord put in the groove of the washer when making the joints? (2.) Is gold size the best thing with which to smear the washer? (3.) What should I use for the joint between the cylinder and the crank case?—R.L.B.

(1 and 2.) The washer ought to have asbestos in its groove. The washer is quite a good one, and if the joints are true does not need any dressing or treating of any kind. (3.) Brown paper soaked in boiled linseed oil; or seccotine or shellac varnish smeared on the paper washer makes an excellent joint.

READER'S REPLIES.

Generator Trouble.

The generator trouble complained of by "H.E.N." on January 11th is caused by overloading the generator. Three lamps are too much for an ordinary generator for really satisfactory work unless the burners are unusually small. The excessive demand for gas causes great heat in the generator; consequently, much steam is generated as well as gas, and the steam condenses in the piping. Even if condensing trouble does not occur the steam causes an inferior light, which is liable to blow or jolt out.—G.S.

Gear Adjustment.

I think "E.G.L.'s" trouble (in *The Motor Cycle* of January 18th), *re* N.S.U. gear, is the same as I have experienced, which was due to deficiency of strength of main spring.—H. C. GRIFFITHS.

RECOMMENDED ROUTES.

BRISTOL TO NEW BRIGHTON.—M.S.

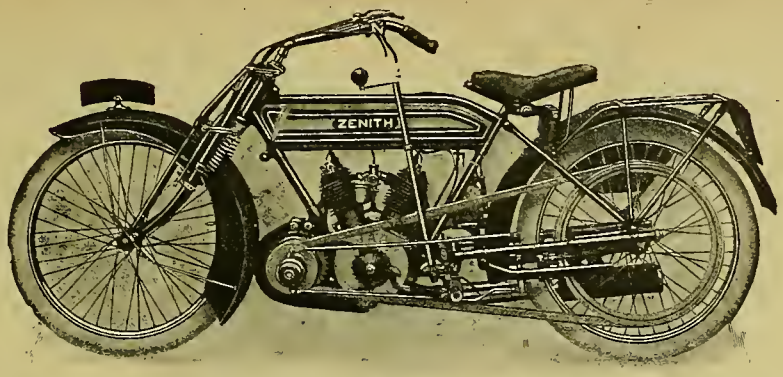
Bristol, Filton, Alveston, Stone, Gloucester, Tewkesbury, Worcester, Kidderminster, Bridgnorth, Shrewsbury, Whitchurch, Chester, Birkenhead, New Brighton. Approximately 93 miles.

WOBURN TO CHATHAM.—C.S.C.

Woburn, Hockliffe, Dunstable, St. Albans, Hatfield, Ware, Hertford, Harlow, Ongar, Brentwood, Tilbury, by ferry to Gravesend, Rochester, Chatham.

BIRMINGHAM TO HASTINGS, VIA DORKING.—A.J.G.

Birmingham, Henley-in-Arden, Stratford-on-Avon, Shipston, Enstone, Oxford, Henley, Wokingham, Bagshot, Guildford, Shere, Dorking, Reigate, Felbridge, East Grinstead, Wych Cross, Uckfield, East Hoathly, Horsebridge, Ninfield, St. Leonards, Hastings.



Equally at home on the track or trackless wastes.

ZENITH

with the Infinitely Variable GRADUA GEAR.

FIRMLY ESTABLISHED on its self-made pedestal of fame, the ZENITH retains its admirers long after other makes have ceased to interest a rider. Recall its record!

Owing to national circumstances it is impossible to give delivery dates: but we are always glad to answer enquiries.

ZENITH MOTORS, :: LTD., :: HAMPTON COURT, :: ENG. ::

THE OIL THAT CIRCULATES EVERYWHERE

Read the reason why **Castrol** was used by the

GREAT WORLD'S RECORD BREAKER

"I have never found an oil to give such excellent results."

Mr. H. C. Pannifex,
Agent for Wakefield's Castrol,
22, Market Street, Melbourne.

Melbourne,
23rd September, 1916.

Dear Sir,—I have used Wakefield Castrol Oil exclusively in my Indian Motor Cycle in my recent World's Records, and I wish to express to you my appreciation of this oil.

During my several years' experience of motor cycle racing and high speed trials and records, I have never found an oil to give such excellent results. I am quite satisfied that a more perfect lubricant than Wakefield Castrol is not obtainable, either for ordinary touring or for racing purposes under extreme conditions.

Wishing you every success with the oil,

I am, yours faithfully,
(Signed) J. R. BOOTH.

C. C. WAKEFIELD & Co.,
WAKEFIELD HOUSE,
CHEAPSIDE,
LONDON, E.C.

WAKEFIELD CASTROL MOTOR OIL

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed ——— & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20 Tudor St., E.C.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisemeat. All replies should be addressed, "No. ooo, c/o 'The Motor Cycle,' 20, Tudor Street, E.C."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged, when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.B.C.

1914 3½h.p. A.B.C., 4 speeds, lamps, horn, tools, and spares, very fast, perfect condition; expert examination; must sell; £65, or near offer.—Westend Garage, Hereford. [7813

Abingdon.

ABINGDON King Dick, 1912, 3½h.p., N.S.U. 2-speed, F.E., coachbuilt combination; must sell; owner called up; £20, bargain.—A. Marsh, 29, Capstone Rd., Bournemouth. [7868

1915 5-6h.p. Abingdon, 3-speed, lamps, etc., coach-built sidecar, hood, screen, numerous spares; a good lot, and cheap; £55. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7692

A.J.S.

A.J.S. 1914¾ 6h.p. Combination, hood, screen, new condition; £65.—29, St. Leonard's St., Bow. [7933

A.J.S., 1915, 6h.p., and sidecar, little used, Lucas lamps; £75.—X., 45, Whittall St., Birmingham. [X5399

A.J.S., 1913, 6h.p., coachbuilt sidecar, fully equipped, perfect condition; 40 gns.—283, Camberwell Rd., Camberwell. [7762

1917 4h.p. A.J.S., owner unable to take delivery owing to joining the colours.—Box 686, c/o *The Motor Cycle.* [X5524

NEW MODELS.

ZENITH, JAMES, ROVER, CALTHORPE, LEVIS, B.S.A., ALLON, Etc.

SECOND-HAND

GUARANTEED MACHINES.

REX, 5 h.p., twin, magneto £8
TRIUMPH, 3½ h.p., complete with access. ... £16
P. & M., 3½ h.p., 1910, 2-speed gear £22
CALTHORPE-J.A.P., 2¾ h.p., 1915, 2-speed.. £27
CALTHORPE-J.A.P., 2¾ h.p., 1916, 2-speed.. £28
SCOTT, 3¾ h.p., 1912, 2-speed, kick start £28
OVERSEAS, 3½ h.p., 1915 ..... £28
REVERE, 2¼ h.p., 1916, 2-stroke, 2-speed ... £29
BRADBURY, 3½ h.p., 1912, 2-speed £30
HUMBER, 3½ h.p., 1914, 3-speed, kick starter £36
INDIAN, 7 h.p., 1913, 2-speed, spring frame.. £39
DOUGLAS, 2¾ h.p., 1914, 2-speed £42
DOUGLAS, 2¾ h.p., 1914, 2-speed, and access. £43
DOUGLAS, 2¾ h.p., 1914, 2-speed, and access. £44
ENFIELD, 6 h.p., 2-speed, C.B. Sidecar £45
INDIAN, 7 h.p., 1914, clutch model £45
INDIAN, 7 h.p., 1914, 2-speed, access. £48
ENFIELD, 3 h.p., 1916, 2-speed, access. £48
INDIAN, Road Racer, 7 h.p., 1915 ..... £49
B.S.A., 4 h.p., 1914, 3-speed, chain drive, C.B. Sidecar £50
INDIAN, 5 h.p., 1915, 3-speed, kick start ... £51
HARLEY-DAVIDSON, 7 h.p., 1915, 3-speed.. £55
INDIAN, 7 h.p., 1915, 3-speed, spring frame, kick start, electric equipment £56
INDIAN, 7 h.p., 1913, 3-speed, spring frame, electric equipment, C.B. Sidecar £69
INDIAN, 7 h.p., 1916, Powerplus, 3-speed ... £67
INDIAN, 7 h.p., 1916, Mod. F., Splitdorf magdynamo, with electric lamps and horn, de luxe C.B. Sidecar £105

WRITE FOR OUR FULL LIST OF BOTH NEW AND SECOND-HAND MOTOR CYCLES AND LIGHT CARS.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. 6h.p. 1914 Combination, hood and screen; £60. —Baker and Sons, 35, Friar St., Reading. [X4938

A.J.S. Spares; prompt delivery.—Cyril Williams, A.J.S. Agent, Chapel Ash Depot, Wolverhampton. [X4090

A.J.S., 1914, 2¾h.p., 2 speeds, chain driven, in real good order and condition; £23.—Percy and Co., 337, Euston Rd., London. [X5499

6h.p. A.J.S. Combination, 1916, wind screen, all lamps, tools, and accessories, perfect condition; £90.—Myatt, 736, Oakhill, Stoke-on-Trent. [X5523

A.J.S. 1916 6h.p. Combination, elaborately equipped, only run 600 miles; cost £120, accept cash at once, £90.—77, Tower Ramparts, Ipswich. [X5569

A.J.S., 1916, 2¾h.p., 3-speed, hand clutch, two Lucas lamps, horn, Cowey speedometer, perfect condition; £48, or exchange higher power, Bat, Norton, Zenith.—Lieut. West, Verne Common, Portland. [7901

A.J.S. (late 1915), 4h.p. combination, spare wheel complete with new steel-studded Dunlop, Watford speedometer, lamps, horn, tools, and all accessories, extension and wind screen sidecar, tyres nearly new, machine in perfect running order, only done 3,000 miles, new rings and valves just fitted; any trial or opening up for purchaser; inspection by appointment; a real bargain; cost £116 new, accept £78 cash, no offers.—Gordon, 68, Heybridge Av., Streatham, S.W. [7751

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

ALLON, Sept., 1915, single speed, original Dunlops; first cheque £20 secures.—1, Felstead Villas, Walton Rd., Clacton. [7753

ALLDAYS Allon, 1916, 2 speeds, clutch model, with 11 gn. C.B. L.W. sidecar; £45.—Croney, 43, Dorchester St., New North Rd., N. [7882

ALLON.—All 1917 models in stock, 36-48 gns.; exchanges and deferred payments arranged.—Maudes', 100 and 136 Gt. Portland St., London, W. Tel.: 552 Mayfair. [7387

Ariel.

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

RIDER TROWARD'S, 78, High St., Hampstead.—1913 Ariel, variable gear, re-enamelled, fast; 19 gns. [7912

ARIEL, 3½h.p., semi-T.T., with variable pulley gear, fast, and in excellent condition; £22.—Layton's Garage, Bicester, Oxon. [7986

ARIEL, the reliable motor cycle, 3½h.p. single, and 5-6h.p. twin models; delivery from stock.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0889

I CAN Give Immediate Delivery of 1917 5-6h.p. Ariels, 3½h.p. Ariels, solo or combinations; exchanges or deferred payments. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7699

Auto-Wheels.

SEVERAL Late Model Auto-Wheels, in splendid condition, from £7 to £10 each.—Murray's, 37a, Charles St., Hatton Garden, Holborn. [X5536

AUTO-WHEELS (two), B.S.A. models in stock, £9/15 and 12 gns. each; deferred terms if desired.—Lamb's, 151, High St., Walthamstow, also at 80, High Rd., Wood Green. [7783

MOTOR CYCLES FOR SALE.

Auto-Wheels.

1915 Auto-Wheel, shock absorber, attached 1915 3-speed New Hudson, oil bath, Roman rims, B90 saddle, both in perfect condition; £15/5; separately, wheel £9/15, cycle £6/10; purchasing motor.—Pearson, 15, Grange Rd., Chester. [X5476

Bat.

BATS.—Latest 4-5h.p. sporting model in stock, 2 speeds, etc.; £65/5.—Below.

BAT, 5-6h.p. sporting model, 3-speed hub gear, usual accessories, good condition; £52.—P. J. Evans, John Bright St., Birmingham. [X5589

BAT-J.A.P., 1915, 4-5h.p., 2-speed countershaft, lamps, horn, speedometer, not done 2,000 miles; £40.—Spencer, Biddenham, Bedford. [7745

Blackburne.

RIDER TROWARD'S, 78, High St., Hampstead.—3½h.p. Blackburne, T.T., long exhaust, equipped for paraffin, perfect; 21 gns. [7920

Bradbury.

BRADBURY, 4h.p., and Watsonian sidecar; a bargain, £12; seen Sunday.—104, Grantham Rd., Clapham. [7896

BRADBURY, 3½h.p., N.S.U. 2 speeds, in real good order; £17.—Percy and Co., 337, Euston Rd., London. [X5506

1913-14 Bradbury, 4h.p., 2-speed, free engine, excellent condition; £19.—Gillham, Midhurst, Sussex. [7821

4 h.p. Bradbury and Sidecar, N.S.U. 2 speeds, all accessories, good order; £20.—No. 199, Booth St., Tottington, Lancs. [X5534

BRADBURY, 1912, 4h.p., good order, £17/10; sidecar, low, fit same, 50/-.—Stonbridge, Agnells Farm, Hemel Hempstead. [X5436

RIDER TROWARD'S, 78, High St., Hampstead.—Bradbury, 1913, 4h.p., with 1915 Sturmey-Archer 3-speed and clutch, overhauled; 25 gns. [7913

BRADBURY Combination, 4h.p., 3-speed, F.E., new tyres, first-class condition, spares; any trial; £36.—67, Wigorn Rd., Bearwood, Birmingham. [X5530

Brough.

BROUGH, July, 1916, 3½h.p., 3-speed, clutch, kick starter, mileage under 1,000, excellent condition, exceptionally fast; £58; owner in Egypt.—Apply after 6 p.m., 51, Berlin Rd., Catford, S.E. [7819

BROUGH, horizontal twin, 1915, 2-speed and free, not used for a year, lamps, horn, spares, etc., tyres and belt as new, property of officer at sea; £35 cash.—Fleetwood, Royal Naval Hospital, Haslar, Gosport. [7751

Brown.

3½h.p. Brown Engine, Bowden countershaft gear, Bosch mag., cane S.E. sidecar, 26×2¼ tyres, wheels, lamps, tools; cheap best offers; called up.—70, Bowler St., Levenshulme, Manchester. [X5527

B.S.A.

B.S.A., 1917 models H and K, with sidecars, in stock.—Moss, Wem. [X5561

COLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A., 1916¾, mileage 750, £56; sidecar, £2/10.—127, Ivor Rd., Sparkhill, Birmingham. [X5538

B.S.A., 1913, 3½h.p., 2-speed, free engine, lamps, etc.; £30.—Ainsworth, Aynho Park, Banbury. [X5465

B.S.A., 1914, 4¼h.p., 3-speed, all chain drive, lamps, horn, accessories; £38.—Agassiz, Military Hospital, Lewisham. [7839

B.S.A., 1914, and coachbuilt sidecar, tyres excellent; nearest £40.—To view write, Dr. Higgins, King George Hospital, London. [7993

B.S.A., model H, 3-speed, chain drive, with superior C.B. sidecar, lamps, horn, tools, etc., a very fine outfit; 60 gns.—Layton's Garage, Bicester, Oxon. [7985

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert J. Pitts, Redditch. Tel.: 91. [X0529

B.S.A., 1915, 4¼h.p., all-chain drive, countershaft gear, fitted Swan 18 gn. sidecar, lamps, horn, numbers; £58.—Wollace, 36, Clarence St., Kingston. [7953

RIDER TROWARD, 78 High St., Hampstead.—1914 B.S.A., 3-speed, clutch, kick start, coachbuilt sidecar, just overhauled at cost of £7, new tyre; 45 gns. [7906

1916 B.S.A., chain drive, 3-speed countershaft gear, and Phœnix coachbuilt sidecar, under 2,000 miles, accessories; £63, or near.—136, Ancona Rd., Plumstead, S.E. [7627

LATE 1915 B.S.A., chain-cum-belt drive, 3-speed, clutch, kick start, with £20 C.B. N.S.U. sidecar, all accessories, carefully used; sacrifice £55.—Box 684, c/o *The Motor Cycle*. [X5472

B.S.A., model K, 1915, 4¼h.p., 3-speed, with almost new semi-sporting coachbuilt sidecar, lamps, horn, etc., overhauled throughout, very sound outfit; £58.—Layton's Garage, Bicester, Oxon. [7984

B.S.A., 4¼h.p., chain-cum-belt, 3-speed, clutch, and kick starter, just delivered from works; £64; easy purchase terms if desired.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., London, S.W. [7764

MAUDES MOTOR MART

SECOND-HAND BARGAINS

SIDECAR OUTFITS.

TRIUMPH, 3½ h.p., 2-speed countershaft, Sidecar ... £32
INDIAN, 1913, 7 h.p., coach-built Sidecar, 2-speed *£39
ZENITH, 1914, 6 h.p., countershaft clutch model £60
RUDGE, 1913, 5-6 h.p. Multi, with Rudge Sidecar £46
ENFIELD, 1912, 6 h.p., 2-speed, twin, Enfield Sidecar £29
RUDGE, 1913, 3½ h.p. Multi, coach-built Sidecar *£33
SCOTT, 1914, 3½ h.p., 2-sp., and Scott sidecar chassis £47
ZENITH, 1915, 3½ h.p., twin, clutch, and C.B. Sidecar £49
P. & M., 3½ h.p., 1913, 2-speed, C.B. Sidecar *£46
JAMES, 4½ h.p., 1914, 3-speed, Empress Sidecar *£55
HARLEY-DAVIDSON, 1916, 7-9 h.p., Bramble Sidecar.*£84
SUNBEAM, 1915, 3½ h.p. Combination *£78
SUNBEAM, 1916, 3½ h.p. Combination £82

LIGHT CARS.

G.W.K., 1914, 8 h.p., just re-painted and overhauled £120
KNIGHT Junior, 1914, 11.9 h.p., sporting body *£145
SINGER, 1913, 10 h.p., 5 lamps, just being overhauled.*£135
SINGER, 1913 (late), 5 lamps, dickey *£140
HILLMAN, 1915, 9.5 h.p., speedometer, little used.*£205
MATHIS, 1914, 15 h.p., 5-seater, dynamo *£325
DAIMLER 38 h.p. Landaulette, C.A.V set.....*—
SWIFT, 1915, 10 h.p., dynamo, like new.....*£250
BELSIZE, 1912, 10-12 h.p., dynamo, being re-painted.*£170
FORD, 1913, 20 h.p., 5-seater, windscreen £60
MORGAN, 1913, 8 h.p., hood and screen..... *£60

SOLO MOUNTS.

DOUGLAS, 1915, 2¾ h.p., 3-speed, like new.....*£54
DOUGLAS, 1915, 2¾ h.p., 2-speed, model V..... £48
DOUGLAS, 1914, 2¾ h.p., 2-speed *£45
DOUGLAS, W. O., 1915, 2¾ h.p., 2-speed £47
DOUGLAS, 1914, 2¾ h.p., 2-speed, and kick-start ..*£46
DOUGLAS, 1914, 2¾ h.p., 2-speed, Lucas horn *£47
TRIUMPH, 1912, 3½ h.p., clutch model, Bosch *£28
TRIUMPH, 1914, 4 h.p., 3-speed, Bosch.....*£48
TRIUMPH, 1912, 3½ h.p., Standard touring *£26
TRIUMPH, 1913, 3½ h.p., 3 speed, all accessories ...*£32
TRIUMPH, 1914 4 h.p., 3-speed (late date) *£48
TRIUMPH, 1909, 3½ h.p., delivered 12.12.08 ..... £19
TRIUMPH, 1914, 4 h.p., 3-speed, electric horn *£41
INDIAN, 1914, 7-9 h.p., clutch model, speedometer .*£40
INDIAN, 1915, 5 h.p., 3-speed, excellent condition ..*£48
INDIAN, 1914, 7-9 h.p., T.T. model, very fast *£41
B.S.A., 1914, 4 h.p., 3-speed, all chain *£47
B.S.A., 1916, 4¼ h.p., 3-speed, mod. K., speedometer*£60
ENFIELD, 1911, 2¾ h.p. twin, 2-speed, chain drive..*£20
ENFIELD, 1911, 2¾ h.p twin, Gradø gear *£14
HUMBER, 1914, 2¾ h.p. twin, light touring machine *£17
HUMBER, 1914, 3½ h.p. 3-speed, water-cooled *£38
CALTHORPE, 1914 (late), 2¼ h.p., 2-sp., 2-str. *£22
NEW HUDSON, 3½ h.p., 3-speed, only done 1,000 miles.*£30
IVY, 1915, 2½ h.p., 2-stroke, Senspray carburetter £16
REX, 1914, 4 h.p., 2-speed, and handle start £28
PREMIER, 1913, 2¼ h.p single-cyl., fine lightweight .. £14
F.N., 1912, 2¼ h.p., 2-speed, shaft drive £17
RADCO, 1916, 2 h.p., single-speed, almost new £20

Machines starred (*) are complete with lamps, horn, etc.
1914 and 1915 DOUGLAS MACHINES bought for Spot Cash

NEW 1917 MODELS.

ROYAL ENFIELD, 2¼ h.p., 2-speed, 2-stroke £44 2
B.S.A., 4¼ h.p., 3-speed, belt, K, 1917 model £64 0
B.S.A., 3½ h.p., Model D, T.T. £52 10
ROVER, 1917, 3½ h.p., 3-speed, solo £69 10
ROVER, 1917, 3½ h.p., T.T., Philipson pulley ... £61 10
ZENITH, 8 h.p., clutch and countershaft £85 10

NEW 1916's (Note Reduced Prices).

ROYAL RUBY, 2½ h.p., 2-speed, J.A.P. engine.... £33 14
ROYAL RUBY, 2½ h.p., 2-speed, 2-stroke £32 5
ROYAL RUBY, 2½ h.p., J.A.P., single-speed £28 15
ALLDAYS ALLON, 2¾ h.p., 2-speed, and clutch ... £38 4
ALLDAYS ALLON, 2¾ h.p., 2-speed, no clutch £29 0
COVENTRY EAGLE, 2¼ h.p., single-speed, 2-stroke £30 18
LEVIS 2 h.p. Popular model £29 0

1914, 1915, and 1916 Models bought for Cash.

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MOTOR CYCLES FOR SALE.

B.S.A.

B.S.A., 1916, 4¼h.p., 3 speeds, kick starter, chain-cum-belt, 3,000 miles, general condition excellent; expert examination; Lucas lamps, horn, speedometer, tools, spares; £48 cash.—Mason, 32, North St., Bishop's Stortford. [7879

B.S.A., latest new models in stock; chain drive model H, 3-speed countershaft gear, £66; chain-cum-belt model K, £64; Montgomery sidecars in stock to fit from 10 gns.; your present machine can be taken as part payment.

B.S.A., 1916, 3-speed countershaft, model K, chain-cum-belt, and coachbuilt sidecar, complete; £62.—Below.

B.S.A., 1916, 3-speed countershaft, model K, chain-cum-belt, lamps, horn, speedometer, etc., as new; £58.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0551

1913 B.S.A. 2-speed, two in stock, belt drive, also one chain drive, £30 each; deferred payments arranged. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7700

1917 B.S.A.'s, all models from absolute stock; cash, deferred, or exchanges, Douglases preferred. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. 'Phone: Hornsey 2562. [7702

B.S.A.'s, both 1917 models actually in stock; deferred payments, exchanges; good prices paid for good second-hand up-to-date machines in part exchange; also 1916 B.S.A. model K and B.S.A. cancelet sidecar, all lamps, £68/10; also in stock, 1916 model H and Swan sidecar, condition A1, £68/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [7787

Calthorpe

CALTHORPE, 1916, 2¼h.p. J.A.P., Enfield 2 speeds, brand new; a sacrifice, £37.

CALTHORPE, 3½h.p., 1914, 3 speeds, and new coach-built sidecar; £35, a bargain.—Percy and Co., 337, Euston Rd., London. [X5513

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799

CALTHORPE Junior, 1914; £15.—Tuke and Bell, Ltd., Motor Dept., Carlton Engineering Works, High Rd., Tottenham, N. [7457

CALTHORPE, 2¾h.p. J.A.P., 2 speeds, free engine, excellent condition; £25; after 6 p.m.—130, Coombe Lane, Raynes Park, S.W. [X5535

1916 2¾h.p. 2-speed Calthorpe-Jap, fitted with all accessories, only been on the road a month; £34.—F. E. Wootten, 55, High St., Oxford. [7943

P. J. EVANS, Birmingham and District Agent.—Calthorpe 1917 models in stock: 2-stroke, 4-stroke lightweights, and 4-5h.p. twins, solo or as combination.—John Bright St. [X5586

CALTHORPE-J.A.P. 4h.p. Twin Combination, 1916, coachbuilt, Enfield 2-speed gear, handle starting, speedometer, and every accessory, sloping top tube, in new condition; £45; after 8 o'clock, or week-ends.—64, Mill Lane, Brixton Hill. [X5477

CALTHORPE-J.A.P.'s, 2-speed models in stock, 38 gns.; deferred terms if desired; also a 1916 2-speed J.A.P. model, with mirror, horn, cyclometer, special engine, £35/10; and 1915 2-speed and accessories, fine order, £27/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169, and Hornsey 1956. [7784

Chater-Lea.

CHATER-LEA 5h.p. Twin Racer, 15 gns.; sidecar, £3.—Miss May, 66, Greyhound Lane, Streatham, S.W. [7900

Clyno.

CLYNO 1912 6h.p. Combination; £35/10.—Motor Exchange, Horton St., Halifax. [7788

1914 Clyno Combination, 6h.p., 3 speeds, clutch, kick starter, snare wheel, new tyres, wind screen, overhauled; £52.—Lieut., Norfolk Hotel, Arundel. [7825

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

CLYNO 5-6h.p. Combination, 1915, Cancelet sidecar, tyres, enamel, and plating like new, all accessories; £42; would accept lightweight part exchange.—Buntings, 2nd Department, Harrow. [7949

CLYNO 6h.p. Combination, 3-speed countershaft gear, kick start, all chain drive, complete with spare wheel and accessories, grand turnout; exchange with cash for Grand Prix Morgan 2-seater car, or sell; offers.—80, Pershore Rd., Edgbaston, Birmingham. [X5409

Connaught.

CONNAUGHT, 1915, 2¾h.p., 2-stroke, U.H., Amac, like new; 14 gns.—101, Aylesbury Rd., Walworth, S.E. [7838

BIRMINGHAM Agent, P. J. Evans, John Bright St.—1917 models of the famous Connaught 2-stroke, standard 2¾-3h.p. models, either solo or with sidecar; miniature models, single or 2-speed countershaft gear; prices from 27 gns. [X5583

Coventry Eagle.

COVENTRY Eagle, 1916, brand new, lightweight Triumph, 2 speeds; £35, a real bargain.—Percy and Co., 337, Enston Rd., London. [X5503

MOTOR CYCLES FOR SALE.

Coventry Eagle.

COVENTRY Eagle, 1916, 3-speed countershaft, coach sidecar, and accessories; cost £100, little used, £69/10.—Motor Exchange, Horton St., Halifax. [7789

Dayton.

DAYTON, 1915, 2-stroke, Model de Luxe, spares and accessories, as new; £15/10.—Hayes, 27, Ormeley Rd., Balham. [7760

Douglas.

DOUGLAS, 1911, minus power unit; £6/10, good tyres.—10, Douglas Av., Christchurch. [X5539

1912-13 Douglas, T.T., fine running order; £24/10. —76, Herongate Rd., Wanstead Park. [X5547

1914 Douglas, 2 speeds, new tyres, etc., Lucas lamps, complete; £36.—Cross, Jeweller, Rotherham. [X5522

DOUGLAS, 1913-14, 2-speed, new Binks, lamps, etc., good order; £31.—47, Hamilton Rd., Reading. [7963

DOUGLAS, 2¾h.p., 1914, 2-speed, clutch, kick starter, perfect throughout; £36.—118, Upper Tulse Hill, S.W. [7952

DOUGLAS, 1913, T.T., single-speed, overhauled, spares, fast; £22.—Jennings, 6, Meadway, Gidea Park, Romford. [7957

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Yeovil. Tel.: 50. [5855

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

RIDER TROWARD'S, 78, High St., Hampstead.—1913-14 Douglas, 2-speed, clutch, kick start, new tyres, overhauled; 33 gns. [7907

DOUGLAS, 2¾h.p., fine order, new tyres, plating, enamelling new, only wants seeing; £17.—14, Dodbrooke Rd., West Norwood. [0869

1913 2¾h.p. 2-speed Douglas, just been overhauled, fitted with lamp, horn, tools, etc.; £32.—F. E. Wootten, 55, High St., Oxford. [7944

DOUGLAS, 1915, 2¾h.p., T.T., 2 speeds, Binks carburetter, accessories; £42/10; exchange higher power.—Pigot-Disney, East Molesey. [7855

1915 2¾h.p. 2-speed T.T. Douglas and accessories, in good condition; £42/10; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [7810

DOUGLAS Specialists.—Gibb, Gough, London Rd., Gloucester. Gibb, the International Douglas rider, winner of numerous cups and gold medals. [2218

1914 Douglas, 2¾h.p., 2 speeds and free, Stewart speedometer, excellent condition; £38.—Tolchard, Butcher, Leytonstone. 'Phone: Wanstead 58. [7837

DOUGLAS, 1914, 2¾h.p., 2-speed, kick starter, clutch, overhauled, re-enamelled, new mudguard, and toolbags, machine in first-class condition; £42.—Jones, Garage, Droitwich. [X5542

DOUGLAS, T.T., 2¾h.p. Colonial model V, new August, 1916, hardly used, all accessories and spares; owner serving; best offer.—Douglas, 1, Church St., Kingston, S.W. [7726

DOUGLAS, late 1914, perfect condition, W model, 2-speed, lamps, horn, Sanspray, T.T. bars, spare touring bars, and footboards; £40; owner active service.—66, London Rd., Twickenham. [7824

DOUGLAS, 2¾h.p.—Brand new models W (clutch, kick start) and U; deliveries in few days to doctors and farmers. Write for particulars.—Robinson's Garage, Green St., Cambridge. [7887

DOUGLAS, 1912, 2¾h.p., kick start model, complete, and fully equal to the average 1914 machine, very good engine, machine overhauled; £26. —Layton's Garage, Bicester, Oxon. [7987

DOUGLAS, 1915, W.O. model, the very latest made, fitted 2 speeds, C.A.V. mag., latest cylinders, without compression tap, absolutely fine order, lamps, horn, tools; £48.—Fenlor, 36, Clarence St., Kingston. [7954

DOUGLAS, 1913, 2¾h.p. twin, semi T.T., very fast, good climber, 120 m.p.g., footboards, 2 lamps, horn, perfect order; accept £25, or exchange with cash for late Triumph.—Clarke, 74, Overstone Rd., Northampton. [X5525

1913 Douglas, 2¾h.p., 2-speed, T.T. model, in fine trim, lamps, etc.; £29. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7694

DOUGLAS 1915 4h.p. Combination, almost new, fully equipped, £65; Douglas, 1914, 4h.p., 2 speeds, £40; Douglas, 1915, 2¾h.p., T.T., 3 speeds, £46; Douglas, 1915, 2¾h.p., W.D., 2 speeds, £45.—Percy and Co., 7, Euston Rd., London. [X5501

Edmund.

EDMUND, 1916, 2½h.p. J.A.P. engine, with patent adjustable spring frame, almost new; £36.—Moss, Wem. [X5563

Enfield.

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

ENFIELD 2¾h.p. Twin, tyres good; accept £18.—N. H. Driffitt, Villa Farm, Barlow, Selby. [7894

ENFIELD 1916 6h.p. Combination, little used, guaranteed perfect, with accessories; £75.—Moss, Wem. [X5562

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4½ h.p.	**B.S.A.**, chain drive	£68 0
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2¼ h.p.	**ENFIELD**, 2-speed, 2-stroke	£44 2
3 h.p.	**ENFIELD**, 2-speed, Canoelet S'car	£68 3
6 h.p.	**ENFIELD** standard Combination.. (2-seater Sidecar £3 extra)	£94 10
7-9h.p.	**HARLEY-DAVIDSON**, genuine 1917 model, standard £93; electric Model B Sidecar, £22 10; Model C	£102 0 £24 10
2¼ h.p.	**LEVIS**, Model E, 2-speed Enfield gear, rustless rims	£47 10
2¼ h.p.	**LEVIS**, Popular model	£32 0
3½ h.p.	**ARIEL**, 3-sp., solo model, kick start	£65 10
2¾ h.p.	**CALTHORPE-J.A.P.**, 2-sp., feather-weight (3 models in stock)	£39 18
2¼ h.p.	**NEW HUDSON**, Model C, 2-speed.	£35 0
7-9h.p.	**HARLEY-DAVIDSON**, Model 16F, and Sidecar	£102 9
2¼ h.p.	**ALLDAYS ALLONS**, 10 models, from £37 16 to	£47 5
2¼ h.p.	**ROYAL RUBY**, sgle-sp. 5 models	£32 10
2½ h.p.	**ROYAL RUBY**, 2-speed in stock.	£40 0

SECOND-HANDS.

1916	**B.S.A.**, Model K, and B.S.A.-Canoelet Sidecar, lamps, and horn	£68 10
6 h.p.	**ENFIELD** 1916 Com., speedometer	£85 0
6 h.p.	**ENFIELD** 1916 Combination, and accessories, scarcely used	£85 0
6 h.p.	**ENFIELD** 1916 Tradesman's Outfit, as new	£90 0
6 h.p.	**ENFIELD** 1916 dynamo lighting Combination, hood, screen, mirror	£88 10
	ENFIELD 1916 Commercial Box Carrier..	£12 12
2¼ h.p.	**CONNAUGHT**, 1916, lamp, horn, only shop-soiled	£29 10
	ALLDAYS MATCHLESS, 1914, single-speed	£12 12
4½ h.p.	**B.S.A.**, Model H, 1916, and Swan Sidecar, heap of accessories	£68 10
2½ h.p.	**ALLDAYS ALLON**, 2-speed, clutch, all accessories	£36 10
2½ h.p.	**COVENTRY EAGLE**, 2-sp., 2-str.; special price	£39 10
2½ h.p.	**JUNO-VILLIERS**, 1916, all access., mileage about 100	£33 10
4½ h.p.	**JAMES**, 1915, 3-speed, kick start, lamps, horn	£57 10
3 h.p.	**ENFIELD**, 1915, 2-speed, kick start, standard equipment	£43 10
3 h.p.	**ROVER**, dry cell battery ignition..	£7 10
7-9h.p.	**HARLEY-DAVIDSON**, Model 16F, and Canoelet Sidecar, and accessories	£89 10
2¾ h.p.	**CALTHORPE-J.A.P.**, 2-speed, and accessories, ridden about 400 miles ..	£35 10
2½ h.p.	**ALLDAYS ALLON**, 1915, single-sp., and accessories	£27 10
2¾ h.p.	**DOUGLAS**, 1913, 2-sp., kick start, lamps, horn	£35 10
2	**AUTO-WHEELS**, B.S.A. models, £9 15 &	£12 12
1	**Enfield Sidecar**, 1915, just been recoached	£12 12
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MOTOR CYCLES FOR SALE.

Enfield.

ENFIELD 3h.p. Twin, 2-speed, free, pedal start, good order, fast; £20.—14, Dodbrooke Rd., West Norwood. [0878

ENFIELD, 6h.p., 1913, and sidecar, picked engine, good machine, lamps, etc.; £39.—47, Hamilton Rd., Reading. [7962

3h.p. Enfield, 2-speed, 1916½ model, first-class condition, lamps, mechanical horn, etc.; 40 gns.—Robbins, Garage, Rugby. [X5174

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock for immediate delivery.—See below.

1917 6h.p. Enfield Coachbuilt Combination, with apron and mat, 2 speeds, clutch and starter, 90 gns.; extra for hood and screen, £4/19; Lucas lighting set, 15 gns.; 8h.p. J.A.P. engine, £2 extra.—Below.

1917 3h.p. Enfield, solo or sidecar mount, 2 speeds, clutch, and kick starter; 55 gns.; sidecars from 7 gns.—Below.

1917 Enfield 2-stroke, 2½h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright St., Birmingham. [X5592

1917 6h.p. Enfield Combination, and accessories, as new, only done 100 miles; £85; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [7808

ENFIELD 3h.p. Twin, latest model, kick starter, Lucas lamps and horn; £50, bargain.—M., 5, Rugby Mansions, Addison Bridge, Kensington. [7850

ENFIELD 1914 Combination, handle starter, accessories, all new tyres; £45.—E. J. Dinham, Upton Farm, Long Sutton, Langport, Somerset. [7840

1916 Enfield Combination, very little used, £82/10; also 1913-14 Enfield coachbuilt combination, £57/10.—Collier's Motories, Deal St., Halifax. [7791

ENFIELD Combination, 1916, 6h.p., 2-speed, dynamo lighting outfit, good condition; £78.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0492

ENFIELD Combination, 90 gns.; 3h.p. twin, £57/10; 2-speed, 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

6h.p. Enfield Combination, new August, 1916; cost £97/10, only run about 500 miles, condition as new, complete with Cape hood, Lucas horn, etc.; 80 gns.—Robbins, Garage, Rugby. [X5173

ENFIELD, 1916, 3h.p., 2-speed, kick start, complete cost £60, accept £46; this machine has been used 50 miles only, and is offered because owner, wounded leg, finds it impossible to use a motor cycle.—Layton's Garage, Bicester, Oxon. [7988

ENFIELD Combination, 1915, 6h.p. J.A.P. engine, 2-speed, handle starter, Pillion seat, lamps, horn, coachbuilt sidecar, with luggage carrier, screen, and apron, condition faultless; must sell; £50, or near offer. —Whale, 12, Hyde Park Gardens Mews, Bayswater, W. [7996

6h.p. Enfield Combination, complete with Lucas lamps, and generators, Lucas horn, Jones speedometer, full kit of tools, practically new, and is unscratched and unsoiled; cost £102/14 a few weeks ago, price now £95; easy purchase terms if desired.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [7859

RIDER TROWARD'S, 78, High St., Hampstead.—1914-15 Enfield, 3h.p., 2-speed, clutch, kick start, overhauled at cost of £7 by makers, perfect, 34 gns.; 1915 Enfield, 3h.p., 2-speed, clutch, mileage 1,500, just decarbonised, 37 gns.; 1913 6h.p., 2-speed, clutch, handle start, 1915 underslung coachbuilt sidecar, fine condition, 43 gns.; exchanges. [7902

ENFIELD 6h.p. 1917 Standard Combination, £94/10 (2-seater £3 extra); 3h.p. solo model, T.T. touring, £57/15, actually in stock; 1916 dynamo lighting combination, hood and screen, like new, £88/10; 3h.p. 1915, ridden just over 1,000 miles, £43/10; 1916 commercial combination, new 2 months ago, ridden 400 miles, £87/10, all accessories; and two 1916 standard outfits, perfect condition, £85 each, fully equipped; easy payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169, and Hornsey 1956. [7786

Excelsior.

EXCELSIOR, 1916, 7h.p., 3-speed, and coach sidecar, used for demonstration; £69/10, cash bargain.—Motor Exchange, Horton St., Halifax. [7790

1914 Excelsior Combination, big single, 3-speed, and accessories, in good condition; £35; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [7809

EXCELSIOR (American), 7-9h.p. twin, 1916 combination, perfect condition, Sparton horn, P. and H. head light, tools, and spares; 50 gns.—G. A. Hurford, R.M.O., Camberley. [X5172

Grandex.

BARGAIN.—1914 Grandex-Precision, 2½h.p., 3-speed Sturmey gear; £14/15.—54, Seymour Rd., Leyton. [7812

RIDER TROWARD'S, 78, High St., Hampstead.—1917 Grandex-Precision, 4½h.p., semi-T.T., in stock; 33 gns. [7918

RIDER TROWARD'S, 78, High St., Hampstead.—1917 Grandex-Villiers, 2-speed, 2-stroke, in stock; 33 gns. [7917

Grippon.

GRIPPON, 2½h.p., B. and B. carburetter, pedal starter, good tyres; £5.—Maxim, 31, Hemthorpe Rd., West Norwood. [0890

MOTOR CYCLES FOR SALE.

Harley-Davidson.

HARLEY-DAVIDSON Models.

INTENDING Purchasers are asked to carefully note that machines type 11F and 11J are 1915 models; 16F and 16J are 1916, and 17F and 17J are 1917 models. It is not possible to obtain 1917 model machines at less than our advertised list prices.

FULL Particulars of date and model of any machine will be readily furnished to enquirers giving engine number.—Harley-Davidson Motor Co., Ltd., 74 Newman St., Oxford St., W. [7997

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for immediate delivery 1917 Harley-Davidsons. [7863

HARLEY-DAVIDSON, 16F, 1916, little used; £54.—Write Lindisfarne, Leopold Rd., Felixstowe. [X5180

HARLEY-DAVIDSON, 1916 F, and Gloria sidecar, 3 lamps; £60.—Lieut. Barron, Hospital, Dudley Rd., Birmingham. [X5537

1916 Harley-Davidson Combination, practically equal new; bargain, £85; seen 9 to 6.—Liquidator, 6c, Lansdowne Hill, West Norwood, S.E. [7974

1916 7-9h.p. Harley-Davidson, electrically equipped, dynamo lighting, indistinguishable from new, done 900; £80.—20, Whitley Rd., Reading. [7979

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons and spare parts. [080

1916 Model 16F Harley-Davidson Motor Cycle, fitted with lamp, horn, tools, etc., in perfect condition; £78.—F. E. Wootten, 55, High St., Oxford. [7941

HARLEY-DAVIDSON 1916 Models delivered from stock on the best terms for cash, exchange, or easy payments; sidecars in stock to fit.—Below.

HARLEY-DAVIDSON, 1915, 7-9h.p., 3-speed, lamps, horn, etc.; £50.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0552

LATE 1915 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0861

HARLEY-DAVIDSON, 7-9h.p., late 1915, with Canoelet 2-seater sidecar, hood, screen, lamps, horn, practically new; best offer.—Davis, Glanmore, Wellington, Salop. [X5396

1915 (late) Harley-Davidson Model 11F, 7-9h.p., and Canoelet sidecar, all spares and accessories, perfect condition; £60; any trial or inspection.—Burt, Bredon View, Malvern. [X5543

HARLEY-DAVIDSON Combination, August 1915, 4,000 miles. Kumfort patent mudguards, well kept, speedometer, and Low generator; £70.—A. Upson, 55 High St., Maidenhead. [7869

7-9½h.p. Harley-Davidson, late 1915 coach combination, electric model, Swan 20 gn. sidecar, speedometer, electric horn and lamps, etc., brnad new Dunlops, in splendid condition; any trial; £70.—Lieut. Wild Highworth, Wilts. [X5492

HARLEY-DAVIDSONS.—Immediate delivery; new magneto models, £84/15; several second-hand 1915 and 1916 combinations from £65; exchanges arranged —Colmore Depots 31, Renshaw St., Liverpool, and 211 Deansgate, Manchester. [0885

HARLEY-DAVIDSONS.—Five genuine 1917 models actually in stock, electrically equipped, £102; standard model £93, model C sidecar £24/10, Model B £22/10 (only limited number available).—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [7781

HARLEY-DAVIDSON, 1916 model 16F, and Canoelet sidecar, wind screen, big F.R.S. lamp, Stewart horn, ridden 600 to 700 miles, really good thing £89/10; deferred terms if desired; exchanges.—Lamb's 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169, and Hornsey 1956 [7785

Hazlewood.

1917 3½h.p. 3-speed Hazlewood, brand new; £73/10.—F. E. Wootten, 55, High St., Oxford. [7945

HAZLEWOOD 1915 Twin Coach Combination, 5-6 h.p., 3-speed countershaft; £69/10.—Collier's Motories, Deal St., Halifax. [779?

1914 5-6h.p. Hazlewood-Jap, 3-speed countershaft kick start, Watsonian coachbuilt sidecar; £40.—91, Burghley Rd., London, N.W. [X548?

Humber.

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [088?

1914 3½h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [088?

HUMBER.—P. J. Evans.—Delivery from stock, 1917 horizontal 3½h.p. twin, special W.D. finish.—John Bright St., Birmingham. [X5587

HUMBER, 3½h.p., 2-speed, coachbuilt sidecar, speedometer, new Dunlops, condition fine; £30.—Chetwins, King St., Richmond. [784?

HUMBER, 3½h.p., 2-speed, cane sidecar, speedometer handle starter, accessories, splendid condition; £30 or near offer.—67, High Rd., Wood Green. [X555?

3½h.p. Humber, 1912, 2-speed, handle starter, gears thoroughly overhauled, fast machine; any trial; sacrifice £18.—W. Clark, Long Melford, Suffolk. [793?

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1914 2¾ h.p. **ALLDAYS MATCHLESS,** 2-speed, and Sidecar **£26 0**

1914 6 b.p. **A.J.S.** and Canoelet Sidecar, hood, and screen **£65 0**

1913 3½ h.p. **ARIEL,** 3-speed, and coachbuilt Sidecar **£38 0**

1915 5-6 b.p. **HAZLEWOOD-J.A.P.,** 3-speed, and coachbuilt Sidecar **£58 0**

1916 4½ h.p. **EXCELSIOR,** chain-drive, 3-speed, shop-soiled; cost £67 4s. **£58 15**

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MOTOR CYCLES FOR SALE.

Humber.

HUMBER, 1915, 3½h.p., 3-speed, nearly new; special price, £57/10.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0842

HUMBER, 1913, 3½h.p., just overhauled, new tyres and gears, 2-speed, handle starting, coachbuilt sidecar; £27.—Smith, 246, Lumb Lane, Bradford. [X5528

HUMBER, 3½h.p., 2-speed, handle start, speedometer, lamps, etc., in good condition; seen any time; £30, or near offer.—Meeks, 55, Dalling Rd., Hammersmith. [7754

1917 3½h.p. Horizontal Twin Humber, handle-bar controlled clutch, T.T. bars, latest model, brand new; in stock; £75.—Robinson's Garage, Green St., Cambridge. [7886

Indian.

INDIAN Powerplus 1916 Combination, practically new, run 80 miles only; £90.

INDIAN, 1915, 7-9h.p., almost new, scarcely scratched; £45.

INDIAN, 1915, 3½h.p. twin, as new; £40.—Percy and Co., 337, Euston Rd., London. [X5509

INDIAN, 7-9h.p., red, 2-speed, free engine; £21, lowest.—46, Mary Rd., West Bromwich. [X5483

INDIAN, 5-6h.p., 1916 model, 3-speed, and kick start; £40.—Baker and Sons, 35, Friar St., Reading. [X4939

INDIAN, 1912, 7-9h.p., 2-speed, cane sidecar, and accessories; £30.—Clements, Fox Hill, Upper Norwood. [7727

FOR Sale, 7-9h.p. Indian, 1915, clutch model, T.T., very little used; £52.—Cyril James, Garage, Church Stretton. [X5351

1915 7h.p. T.T. Indian, in very good condition, fitted with lamp, horn; £43.—H. Dix, Bria croft, Fulbrook Rd., Cambridge. [7770

INDIAN 7-9h.p. Powerplus, 1916, Millford sidecar, electric light, horn, tyres as new; £85.—Drewery, New Silksworth, Sunderland. [X5597

INDIAN, 1916 model C, electrical equipment, 3-speed, 7-9h.p., spring frame, 20 gn. Swan S.C.; £80.—G. Cross, jun., Marston, Oxford. [X5358

INDIAN, 7-9h.p., 2 speeds, hand clutch, lamps, Indian coachbuilt sidecar, good condition; £30; exchange lower power.—101, Devons Rd., Bow. [X5166

INDIAN, 1915, 7-9h.p., 3-speed, electric lighting, spring frame, with Mills-Fulford sidecar, speedometer, spare valves, electric bulbs, new chain, etc.; £70.—Below.

INDIAN, 1915, 5h.p., 3-speed, semi-T.T. bars, with racing torpedo sidecar, spare new tyre, fine outfit; £58.—Below.

INDIAN, 1915, 5h.p., 3-speed, semi-T.T. bars, electric lighting, very little used, in fine condition; £48.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0480

INDIAN Combination, 1915 (late), 3-speed, electric lighting, hood and screen; will accept best offer; excellent order.—Lindsay, 12, Duke's Mews, Manchester Sq., W. [7748

1915 7.9h.p. Clutch Model Indian, fitted with electric lamps, speedometer, horn, tools, etc., in very good order; £48.—F. E. Wootten, 55, High St., Oxford. [7942

RIDER TROWARD'S, 78, High St., Hampstead.—1915 5h.p. Indian, 3-speed, clutch, 43 gns.; another, with underslung Indian coachbuilt sidecar, 48 gns.; exchanges. [7905

1916 Indian, 5h.p., 3-speed gear, clutch, and kick starter, lamps, horn, and all accessories, only run 1,500 miles, as new; offers.—E. Bamber and Co., Ltd., Birkdale, Lancs. [7363

INDIAN 1916 Model in stock. I have a model C left, £78; specification includes 7-9h.p., 3 speeds, countershaft, clutch, and kick starter, spring frame, and electric lamps and horn, £78.—P. J. Evans, John Bright Ct., Birmingham. [X5595

LATE 1916 7-9h.p. Indian Combination, tea weeks old, coachbuilt sidecar, electric head, rear, sidecar lamps, insured till November, perfect condition, complete as new; cost £108, take £78; officer returning Front.—Lieut. Horner, Brook Street Barracks, Birmingham. [X5545

1915¾ Indian, 7h.p., Millford combination, semi T.T. bars, 3 speeds, clutch, kick starter, 28×3 Dunlop tyres unpunctured, not done 1,000 miles, enamel and plate unscratched, mechanical condition perfect; expert examination; electric horn and lighting set, speedometer, tools; £75.—Box 671, c/o *The Motor Cycle.* [X5355

Ivy.

IVY, 2½h.p., 4-stroke model, only run 200 miles, guaranteed perfect; bargain, £25.—Moss, Wem. [X5567

IVY, 1915 (Aug.), 2-stroke, 2-speed, in sound mechanical condition; £17.—Eldridge, Clothier, Fordingbridge. [7865

IVY-PRECISION, 4½h.p., in fine order and condition; £20.—Maxim, 31, Hamthorpe Rd., West Norwood. [0871

James.

JAMES, 4¼h.p., 1913, 3 speeds, suit sidecar, fast; £25.—Chatwins, King St., Richmond. [7848

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803

MOTOR CYCLES FOR SALE.

James.

JAMES 2-strokes, 1917 models, for immediate delivery.—Colmore Depot, 211, Deansgate, Manchester. [0888

JAMES 1916 Lightweight, 2 speeds, run 600 miles, equals new in every detail; £28, a bargain.—Percy and Co., 337, Euston Rd., London. [X5502

1914 4¼h.p. James, 2-speed gear box, chain drive, kick starter; £38, or exchange Brough, Henderson, or flat twin.—Particulars, Pirie, Cranleigh. [7958

JAMES 3½h.p. Twin, late 1915, 3-speed countershaft, handle-bar clutch, good running order, lamps, horn, etc., with or without sidecar; what offers?—Lieut. Newbold, R.M. Depot, Deal. [X5466

JAMES, 1915 model No. 6 combination, 4¼h.p., 3-speed, lamp, horn, speedometer; £57/10; easy terms, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [7780

JAMES, 1917 model, for immediate delivery from stock. Big "Four" combinations, with and without Lucas dynamo lighting set; 3½h.p. twin, and 2-stroke models.—P. J. Evans, John Bright St., Birmingham. [X5594

JAMES 4¼h.p. Combination, 1914, 3-speed countershaft, chain drive, easy starter, 3 Lucas lamps, new cover on back wheel, also tradesman's baywood sidecarrier (interchangeable), in fine condition; complete £60.—45, Finchley Rd., Altrincham, Cheshire. (D) [X5549

J.E.S.

J.E.S., not done 1,000 miles, fitted to Triumph bicycle, new tyre; bargain, 13 gns.—Box 687, c/o *The Motor Cycle*. [X5531

1¼h.p. J.E.S., 1914, mag., Druid spring forks, horn, spare belt; £9.—Dodd, 13, Birchwood Rd., West Byfleet, Surrey. [7778

Kerry.

KERRY 5h.p. Twin, thoroughly overhauled and re-enamelled, Bosch mag., a real bargain, £10/10.—Percy and Co., 337, Euston Rd., London. [X5505

Lea-Francis.

3¼h.p. Lea-Francis, as new, ridden 800 miles; £50.—Steele, Cheddleton Heath, Leek. [X5494

LEA-FRANCIS, 3½h.p., nearly new tyres and chains, perfect in every way; owner on active service; £42; all accessories.—Lieut. Hunter-Smith, Merilees, Cedar Av., Chelmsford. [7947

LEA-FRANCIS, late 1915, 3½-4h.p. twin J.A.P., Bosch mag., 3-speed countershaft gear, clutch, and kick starter, with Montgomery De Luxe 21 gn. sidecar, and Lucas accessories, almost new, guaranteed perfect throughout; £75.—Moss, Wem. [X5564

Levis.

LEVIS, latest, brand new, single and 2-speed models in stock.—Moss, Wem. [X5560

LEVIS Popular, Sept., 1916, done 100 miles; £30, or near offer.—Saxby, Braunston, Rugby. [X5434

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804

LEVIS, 1915, thorough good condition, belt and tyres new, all accessories; 16 gns.—15, Summerhill Rd., Dartford, Kent. [7964

LEVIS, 1915, splendid condition, new tyre and belt, just overhauled; £22, bargain.—Warren, 121, Trinity Rd., Upper Tooting. [7880

LEVIS, 2¼h.p. Popular model, just delivered from works; £32; easy purchase terms if desired.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., London, S.W. [7765

1914 Levis Baby, in fine order and condition; a rare bargain, £19. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7695

Lincoln-Elk.

1914 Lincoln-Elk, 2¾h.p., 2-stroke, 2-speed, in excellent condition, but damaged key-way in shaft, only run about 400 miles; what offers?—Tickle, Ironmonger, Cockermouth. [5356

RIDER TROWARD'S, 78, High St., Hampstead.—1915 Lincoln-Elk, 4¼h.p., 2-speed countershaft gear, hand clutch, kick start, mileage 4,000, powerful sidecar or solo mount, perfect; 28 gns. [7916

L.M.C.

1913 4h.p. L.M.C., excellent coach sidecar, Armstrong heavy 3-speed, Binks, powerful, reliable outfit; £32.—4, Park Rd., Dereham, Norfolk. [X5354

Martin.

1914 4h.p. Martin-Jap, 2-speed, good as new; bargain. £27, offers.—Stuart, 35, Colwell Rd., E. Dulwich. [7857

1913 Martin-Precision, 4¼h.p., sidecar, lamps, and spares, good condition; £23.—Hadley, 36, The Hale, Tottenham. [7835

Matchless.

MATCHLESS Motor Cycles; no quicker delivery obtainable than from Colmore Depots. [0881

MATCHLESS-J.A.P., 3½h.p., fast, just overhauled; bargain, £17/10.—Gittins, Ltd., Oswestry. [X5403

MATCHLESS Combination, late 1913 model, coach-built; £40.—Lindsay, 12, Dukes Mews, Manchester Sq., W. [7747

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	ALLDAYS ALLON, 2-stroke, 2-sp.,clutch	£48	0 9
6	h.p. **ENFIELD** Combination, 2-seat. Sc.	£102	0
6	h.p. **ENFIELD** Combination	£94	10
5	h.p. **INDIAN** Model B Combination ...	£86	10
2½	h.p. **NEW IMPERIAL,** lady's model ..	£50	8
2½	h.p. **EDMUND-J.A.P.,** spring frame ..	£48	10
3½	h.p **EXCELSIOR,** 3-speed	£65	0
4-5	h.p. **ZENITH,** Model D	£73	18
2¼	h.p. **LEVIS,** 2-stroke, Popular model ..	£32	0
2½	h.p. **NEW IMPERIAL,** 2-speed, k/start	£48	8
2½	h.p. **NEW IMPERIAL,** 2-speed, Model I	£40	19
2½	h.p. **CALTHORPE,** 2-stroke, 2-speed ..	£34	13
2½	h.p. **CALTHORPE-J.A.P.,** 2-speed	£39	18
2¼	h.p. **LEVIS,** 2-sp., Model E, chain drive	£47	10
5	h.p. **CLYNO,** Military Model, with Side-car, spare wheel, and luggage grid ...	£108	3
6	h.p. **ENFIELD** Combination, elec. equip.	£110	5
2¼	h.p. **ENFIELD,** 2-stroke, 2-speed	£44	2
7	h.p. **INDIAN,** Model C, 3-speed	£78	0
3	h.p. **ENFIELD,** Model 140	£57	15

BIG VALUES AT GLASGOW

Will be found in our full List of Second-hands, including those below. Copies sent free. Those marked * are worth special notice.

h.p.		
4	*twin **PREMIER,** 2-sp., lamp, generator, speedometer	£26 0
7	**INDIAN,** 1912, 2-speed, and Sidecar ..	£36 0
6	***MATCHLESS-J.A.P.,** 1914, and Sidecar, full equipment	£44 0
7	**INDIAN,** 1915, 3-speed, F.E. clutch, cradle spring frame, kick, almost new	£58 0
2½	***HOBART,** 1915, 2-sp., 2-stroke, counter-shaft shop-soiled	£29 10
6	**ENFIELD** 1913 Combinat'n, good order	£45 0
7	**INDIAN,** 1914, 2-sp., F.E., spring frame, coach Sidecar, excellent condition ...	£49 0
2¾	**DOUGLAS,** Colonial, T.T. Model, 1915, very full equipment, grand condition	£46 0
3½	***SUNBEAM,** 1916, 3-speed, and F.E., with Millford Sidecar, full equipment. Perfection	£85 0

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Offered in our Second-hand List, including the undermentioned and many others. Copies free. Those marked * are worth special notice.

h.p.		
3½	***TRIUMPH,** fixed engine, lamp, horn ..	£20 0
2½	***CALTHORPE,** 1915, 2-stroke, very little used	£23 0
3½	***B.S.A.,** 1913, belt drive, 2-speed, F.E.	£25 0
3½	**ROVER,** 1913, 3-speed gear, full equip.	£27 0
3½	***RUDGE,** 1913, multi gear, splendid condition	£35 0
3	**ENFIELD,** 1915, 2-speed, lamp, generator, mechanical horn	£38 0
7	***INDIAN,** 1914, spring frame, 2-speed, coach-built Sidecar, very full equipm't	£42 0
3	**ENFIELD,** 1915, 2-sp., full equipment, fine condition	£43 0
6	**BRADBURY,** 1914, 3-sp., F.E., clutch, kick start, Millford Sidecar	£43 10
4½	**B.S.A.,** 1914, 3-sp. c/shaft gear, kick start, clutch, torpedo S'car, elec. equip.	£48 10
6	***ENFIELD,** 1915, 2-speed, handle start, coach Sidecar, good as new	£68 0
6	**A.J.S.,** 1914 3-speed, coach Sidecar, full equipment, grand running order	£55 0

ALEXANDERS

113-115, LOTHIAN ROAD, EDINBURGH.
272-274, GT. WESTERN RD., GLASGOW

MOTOR CYCLES FOR SALE.

Matchless

7-9h.p. Matchless, Mills-Fulford sidecar, in fine order, electric lights, numbers, etc.; £73.—Cross, Effingham Sq., Rotherham. [X5521

MATCHLESS 8B Combination, 1915, new tyres, everything complete, in first-class order.—Turner, 12, Church St., Macclesfield. [X4921

MATCHLESS, 1913, 6h.p. J.A.P. engine, clutch model, in good order, very fast; £35.—R. Lear, 52, High St., Harriseahead, near Tunstall, Staffs. [7815

MATCHLESS 1915 7-9h.p. M.A.G. Combination, 3-speed, enclosed chain drive, all perfect, Lucas accessories, Cowey; £85.—211, Deansgate, Manchester. [7469

7-9h.p. Matchless Combination (M.A.G. engine), 3-speed countershaft gear, clutch and kick starter, complete with Lucas head lamp and generator, Lucas horn, rear lamp, speedometer, tools and spares, very little used, and in fine order and condition; price £85; easy purchase terms if desired.—Harrods, Ltd., Motor Car Dept., Brompton Rd., S.W. [7858

MATCHLESS Combination, M.A.G. engine, 3 speeds gear box, clutch, and kick starter, fully equipped with Lucas head lamp and generator, 2 horns, pump, tools, and spares, very little used, and in excellent order and condition throughout; £85; easy purchase terms if desired; exchanges entertained.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., London, S.W. [7743

Minerva.

MINERVA, 8h.p. twin, Bosch, N.S.U. 2-speed, free engine, sidecar, new tyres and belt, sound condition, fast; £15 cash.—Box L3,035, c/o *The Motor Cycle*. [7769

MINERVA, 2¾h.p., m.o.v., special racing engine, dropped frame, low built, T.T. bars, 26in. wheels, in guaranteed perfect order; £8/10; after 8 o'clock or week-ends.—64, Mill Lane, Brixton Hill. [X5480

New Hudson

3½h.p. New Hudson Combination, 1914; cost £84, sacrifice £42.—Parker, St. Giles', Oxford. [X5397

NEW Hudson, 2¼h.p., 2-speed, 2-stroke; £38.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0840

1914 New Hudson, 3½h.p., 3 speeds, and clutch, kick starter, and accessories, in good condition; £30.—82, Caledonian Rd., London. [7871

1915 2¼h.p. 2-stroke New Hudson, in perfect condition; £22, or near offer.—Wellboy Garage, Woodford Rd., Forest Gate. Tel.: 309 Stratford. [7736

1913 4h.p. New Hudson, 3 speeds, new tyres and tubes, very nice machine; £28.—Wellboy Garage, Woodford Rd., Forest Gate. Tel.: 309 Stratford. [7737

NEW Hudson 1912-13 3½h.p. Combination, 3 speeds, clutch and starter, good condition, £28; 1912 combination, £22.—P. J. Evans, John Bright St., Birmingham. [X5591

1914 4h.p. Greg. New Hudson Combination, 3-speed, handle starting, in good condition; £40, or near offer.—Wellboy Garage, Woodford Rd., Forest Gate. Tel.: 309 Stratford. [7738

NEW Hudson, 1913, and wicker sidecar, 3-speed, 4 h.p., free engine, new tyres and belt, lamps, and horn, guaranteed perfect mechanical order; £25, or separate; after 8 o'clock, or week-ends.—64, Mill Lane, Brixton Hill. [X5479

NEW Hudson 1914 4h.p. Coachbuilt Combination, high grade underslung sidecar, countershaft 3-speed, clutch, kick starter, spring footboards, Lucas accessories, little and carefully used, new condition throughout, mileage under 2,000; £45.—Box L3,043, c/o *The Motor Cycle*. [7968

1915 4h.p. New Hudson and Sidecar, 3-speed countershaft gear box, all in splendid order and condition, all lamps, etc.; £52; deferred payments arranged. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7705

New Imperial.

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Imperial-Japs. Immediate delivery. [7862

NEW Imperial, 2½h.p., 2-speed, and kick start models, just arrived.—Gittins, Ltd., Oswestry. [X5401

COLMORE Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0805

RIDER TROWARD'S, 78, High St., Hampstead.—1915-16 New Imperial, 2-speed, perfect order; 25 gns. [7915

1917 New Imperial-Jap, 2¾h.p., 2-speed, as new, all accessories; £38.—Green, 89, Wymering Mansions, Maida Vale, London. [7853

BIRMINGHAM Agent, P. J. Evans, John Bright St. —1917 New Imperial models in stock for immediate delivery; 2¾h.p. 2-speed models, 38 gns.; also clutch models for light sidecar work. [X5593

NEW Imperial 1917 Models for immediate delivery; model 1, 39 gns., No. 2 46 gns.; several second-hand 1916 machines from £30.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0886

Norton.

NORTON Big Four and Sidecar, brand new; first cheque £89/10 secures.—Percy and Co., 337, Euston Rd., London. [X5500

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New Motor Cycles by Permit.

AS will have been gathered by recent observations in these pages, the outlook for manufacturers not exclusively engaged upon war work has been rather obscure, as the permits in their possession allowed them to carry on the production of motor cycles only until the 15th inst. It was suggested, too, that this date might be final, but we are glad to say that several firms have now received permits to carry on for another few weeks when the position will again be reviewed, but the proviso which has been in existence in the car world for some time past has now been extended to motor cycle manufacturers. This is, that no new machines may be supplied without the permission of the Ministry of Munitions, which means that any buyer who can show that the purpose for which he requires the machine is of national importance, such as doctors, farmers, members of the military and naval services, and munition works inspectors who have constant journeys to perform, will be able easily to obtain a permit. Even so, it is added, most naturally, that the assembling of new motor cycles must not interfere with the manufacture of munitions. One probable effect of this Order will be to send up the already inflated prices of second-hand machines.

Mud—What is its Proper Place?

WE offer no apology for reverting for the thousand and first time to the hackneyed subject of mudguarding, for, although at the time of writing the roads are thickly covered with beaten snow, yet we know that wet skies and muddy roads are sure to be with us again before long. A letter from a rider of a lightweight complains that his front guard is cut away to make room for the forks, and that in wet weather a constant stream of mud issues from this opening, spattering both rider and engine with filth. The rear mudguard, he says, is apparently devised to keep the belt nicely lubricated with mud and water. This possibly is an extreme case; still we know, both from our own experience and that of others, that standard mudguarding leaves much to be desired. As a rule, the front guard is the greater offender, but it certainly has the more difficult task to perform. The mud blown back from a rear guard is left behind, that blown back from a front guard reaches both machine and rider unless it is trapped by splash guards. The side valances of a front guard are not much use because mud simply runs down them and drips from the edges or blows back from the forks and mudguard stays. Also the valances make the guard more difficult to clean and more likely to get choked. This can very easily happen with slushy snow, as we found out to our cost recently.

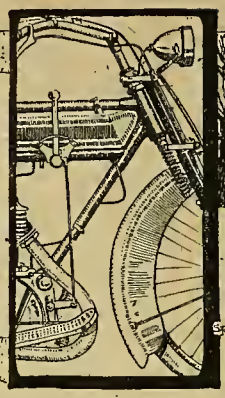
The extra wide guards extending beyond the forks seem to be the most efficient and satisfactory standard guards at present on the market, but these are fitted to very few makes of machine. They could, we think, be improved by being made with a continuous slope downwards from front to rear, and the edges turned upwards and inwards to act as paths down which the liquid mud could run. Thick mud would stick in these grooves, but being accessible they could easily be cleaned.

There are, as of course we are aware, several excellent splash guards on the market retailed by the accessory houses, but when a man buys a first-class mount he ought not to have to spend money in rendering it fit to ride in winter. Again, it is not difficult for a rider to fit efficient (but ugly) splash guards for himself, but after all is said and done this is a question that should be tackled by the manufacturer. It is really extraordinary that so few machines are fitted with screens beneath the engine. These are not at all unsightly, are easily attached and very useful—moreover, they protect both engine and silencer from a great quantity of objectionable road dirt.

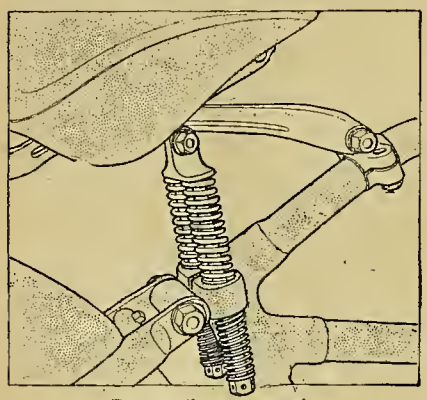
An index to the advertisements in this issue will be found on the page facing the back cover.

SPRING SEAT-PILLARS.

The Desirability of Comfort. A Good Substitute for an Entirely Sprung Frame.



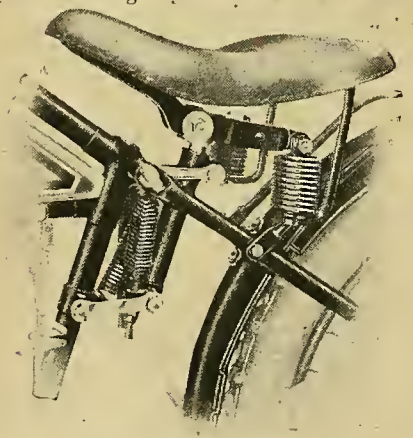
THE ideal spring frame is slow in materialising, but in its absence it is encouraging to note that many makers are endeavouring to render their machines more comfortable by the introduction of spring saddle pillars. Several



Rex cantilever suspension.

firms have already adopted them as standard, though others still regard them as an "extra." Although this type of springing is not so good as the ideal spring frame would be if it could be evolved, it is certainly a simple way of adding to the comfort of the rider.

In nearly all designs of the fully sprung frame that have so far been manufactured very many difficulties arise. Among other points, the rigidity of the rear wheel has had to suffer, if not at first, as soon as slight wear takes place. Rigidity of the rear wheel is an important point to be considered. Lack of it causes most unpleasant sensations when taking sharp turns at speed or when negotiating difficult stretches of rutty or greasy road. This disadvantage may easily counteract the advantage of increased comfort gained by the springing. The insulation given by the spring seat-pillar, although insulating only the rider from road shocks, at any rate permits the rigidity of the rear wheel to be maintained, and also allows for a simple construction of the frame, which is, of course, an important point if the price of the complete machine is to be kept down. The spring seat-pillar was perhaps one of the earliest attempts to reduce road shocks, and it will be remembered that a most excellent example was on the market incorporated as a standard fitment on the Rex models as early as 1907. Probably the chief disadvantage with the spring pillar is that the riding position is necessarily somewhat higher than it would be with the ordinary saddle attachment, but with the low built frames of to-day this can really be overlooked. Among the many machines now fitted as standard with these extra springing devices—or on which a device can be included if specified—may be mentioned the following leading makes: Clyno, Ariel, A.J.S., Rex, and Leader.

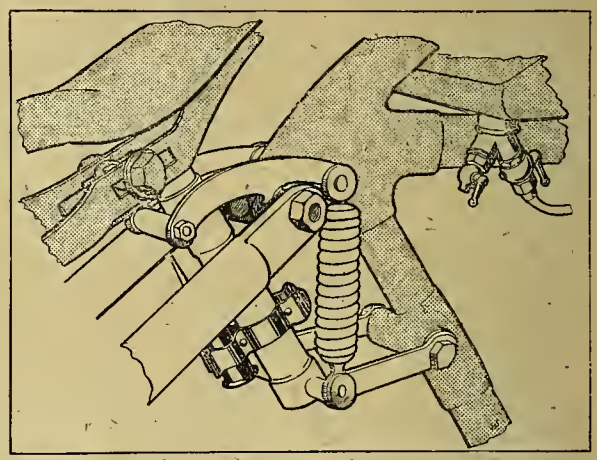


The Ariel saddle suspension is based on front fork principles, the auxiliary seat-pillar being adjustable to various weights.

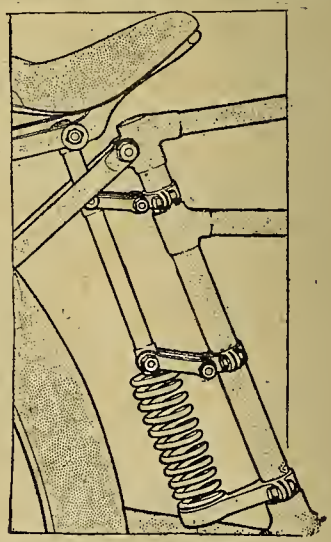
An Early Model.

The spring seat-pillar fitted to the Rex de Luxe since 1907 is quite a simple affair, and is on the cantilever principle. The tube on which the saddle is carried is hinged at the foremost end, where it is attached to the cycle frame by means of a clip. Amidships are two guide rods, which pass through two guide lugs cast on the saddle lug of the machine. Above the guides are the two main springs, while below are situated two springs to take the rebound.

The Ariel device is on front fork principles, and consists of an auxiliary seat-pillar carried at the rear of the frame saddle tube, to which it is connected by four rocking links. The springing is obtained by two suspension springs, while a third spring is provided to absorb the recoil shocks. The auxiliary seat-pillar is adjustable to a



On the latest Clyno a spring saddle-pillar is used, also based on the front fork principle.



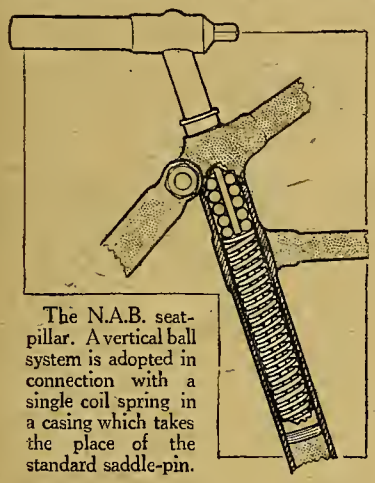
The A.J.S. device consists of an auxiliary saddle tube, beneath which is one large compression spring.

Spring Seat-pillars.—

certain extent to suit the weight of rider, while if so desired it can be entirely removed, and an ordinary seat-pillar fitted in the usual way.

On the latest War Office model Clynos the spring saddle-pillar is also on the spring front fork principle. The saddle pin proper telescopes into a tube which is connected to the cycle frame by means of four links. The attachment to the frame is by bolts passing through specially designed lugs brazed to the frame; two tension springs sustain the load.

The A.J.S. device, though not a standard fitment, can be had as an extra on any model. It consists of an auxiliary saddle tube situated behind the usual saddle tube of the frame. The auxiliary tube is attached to the frame by means of two pairs of links, the clips that secure the device to the frame being detachable. The springing is obtained by means of one large compression spring situated beneath the auxiliary saddle support to which one end of the spring is secured, the other end being supported on and attached to a stout bracket which is clipped to the down tube.



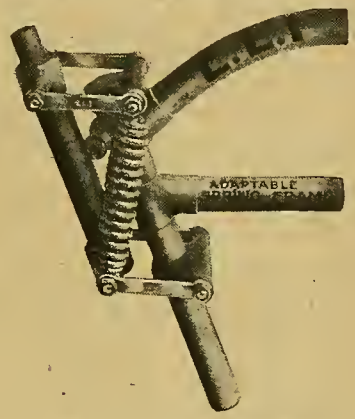
The N.A.B. seat-pillar. A vertical ball system is adopted in connection with a single coil spring in a casing which takes the place of the standard saddle-pin.

Auxiliary Attachments.

Apart from the machines fitted with standard spring seat-pillars, there are now attachments available for fitting to existing motor cycles. Among these, probably the best known is the N.A.B., which has been on the market for many years. The pillar fits in place of the usual standard saddle pin, and consists of a solid pin telescoping in a casing, which fits in the usual saddle-pillar tube. The pin is supported on a strong coiled spring, and rows of ball bearings are inserted in grooves between it and the outside casing, these being to preveut the movable pillar from jamming, and to give a free and easy movement. The saddle is mounted on the top of this movable pin, and an adjustable top is provided for the purpose. The N.A.B. can also be obtained in a form which clamps to the down tube of the bicycle frame, and so gives a very low riding position. It will suit machines not fitted with the usual hollow saddle tube.

The E.L.I. adaptable spring frame manufactured by Eli Clarke, the well-known Douglas rider of Bristol, is another serviceable spring saddle attachment which will fit practically any machine.

It is really an adaptation of Druid fork design to the saddle-pillar. The saddle-pillar proper is attached to the down tube by means of links, as in the spring fork, these being secured to the tube by means of substantial clips. Two strong coil tension springs extend from the frame pivot of the upper links to the floating pillar pivot of the lower links, the weight of the rider being, therefore, supported by these springs. The motion given to the saddle would be exactly the same as that of the front spring forks.



The E.L.I. is another adaptation of front fork springing, and is easily attached to any machine.

RACING IN CHILE.

Success of British Machines in Santiago Speed Trials.

THE most important motor cycling event of the year held at Santiago de Chile took place recently over an oval course measuring nearly 1,700 metres (just over one mile). The course has a fair surface, but, as it has no banking, excessive pace is impossible, but speeds of 56, 59, and 62 m.p.h. over the lap were attained.

Junior Race.

The competitors were divided into the following classes: Class I. for machines under 350 c.c.; Class II. machines under 450 c.c.; Class III. under 500 c.c.; and Class IV. unlimited. Class I. contained the following entries: three Junior Triumphs, one Wanderer, one Alcyon, one F.N., and one Brown, while Class II. contained four N.S.U.'s, three Peugeots, and one Humber.

Classes I. and II. were run over the course concurrently, one of the Triumphs, ridden by H. Wilson, failing to get away; but later this rider put up some extraordinarily fast laps, and worked himself into the fourth position. In the sixteenth lap Corson (Peugeot) retired with engine troubles, and on the twenty-seventh lap Wilson ran into first place. Subsequently, however, his tyre burst, and though he tried to finish, the tyre came off the rim, throwing the rider at the very last turn. Results:

FIFTY KILOMETRES.

CLASS I.

1. A. Checa (Alcyon, 271 c.c.)
2. A. Friedemann (Wanderer, 251 c.c.)

Speed 37¼ m.p.h.

CLASS II.

1. L. Poggi (Humber, 350 c.c.)
2. J. Birrer (N.S.U., 396 c.c.)

The Senior Race.

The Senior race was very keenly contested between the Triumph, Harley-Davidson, and Indian machines. The Triumph riders put up some marvellous riding, attaining speeds of 58 and 59 m.p.h., the American machines proving heavy to handle for the constant cornering at speed. Maillard, the crack rider of the Valparaiso Moto Club, experienced trouble with the belt of his Trinmph twisting, and after putting up a splendid race was forced to retire. F. Bolt, an Indian rider, retired on the nineteenth lap, and on the twenty-fifth lap one of the H.D. riders came to grief, luckily sustaining no serious injuries. Results:

HUNDRED KILOMETRES.

CLASS III.

1. F. Moreno (T.T. Triumph, 498 c.c.), time 1h. 24m.
2. F. Larios (Kynoch-Jap, 499 c.c.)
3. E. Betteley (Motosacoche, 495 c.c.)

Won by three laps. Speed 44.4 m.p.h.

CLASS IV.

1. A. Macchiavello (Triumph, 550 c.c.), time 1h. 19m. 16⅘s.
2. C. Grunnert (Harley-Davidson, 998 c.c.)
3. R. Maira (Indian, 998 c.c.)

Speed 47 m.p.h.

THE ANNUAL GENERAL MEETING OF THE MOTOR CYCLING CLUB.

THE annual general meeting of the M.C.C. was held at the Café Monico, Piccadilly Circus, London, W., on Wednesday, January 31st. Mr. E. M. P. Boileau was invited to take the chair.

The only business of the meeting was to receive the annual report and statement of accounts.

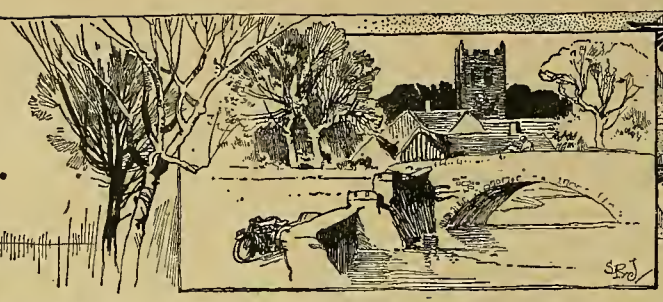
During the meeting it was announced that Mr. Arthur Millbourn is acting as hon. sec. *pro tem.*, and Mr. W. H. Wells is doing the work of treasurer.

It was proposed by the Chairman and seconded by Mr. H. Taylor that the officers of the club and committee should be re-elected for the present year. The auditor, Mr. W. Richards, was also re-elected.

Mr. Wells proposed and Mr. Armstrong seconded the proposal that no applications for subscriptions should be made to members during the war. The proposal was carried *nem. con.*

Mr. R. H. Head, chairman of the club, mentioned that the hon. sec. of the club, Mr. Southcomb May, M.M.G.S., had been wounded in East Africa, and was in hospital at Cape Town. Another member of the committee, Mr. E. B. Dickson, had also been wounded.

Protection from the Mud.



SOME WAYS OF KEEPING DRY AND CLEAN WHILE RIDING.

FOR many months, both editorially and in the Correspondence columns, *The Motor Cycle* has attempted to bring home to manufacturers the desirability of adopting light, easily removable leg shields as a standard fitment, and it is to be observed that our efforts in this direction are slowly but surely yielding fruit. The motor cyclist who has once realised the comfort of efficient shields takes badly to a machine that is not so fitted; indeed, he regards the ordinary motor cycle, which necessitates the donning of heavy overalls even for the shortest of winter spins, as a monstrous thing to be avoided, not only on account of discomfort, but from an economical point of view as regards boots and clothing. Leg shields of some sort he must have, and if these are not supplied by the makers he may have some difficulty in obtaining a pair to fit his particular mount. Rather than go without he makes some sort of attachments of his own, which, though generally serviceable, do not as a rule improve the appearance of the machine.

A quickly adjusted spat form of spring overall.

Mudguarding is not, of course, a matter either for home attention or for the accessory maker, since in reality it should be attended to by the manufacturer; but, since the accessory maker has hitherto held undivided possession of the market, we append descriptions of some of the latest shields to come before our notice.

A COVENTRY MOTOR CYCLIST'S IDEAS.

THE following ideas have been carried out by a well-known Coventry motor cyclist owning a Rudge sidecar, who thus describes his devices:

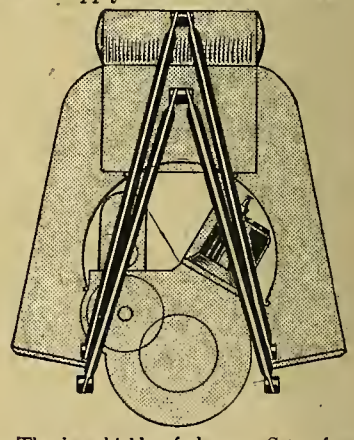
"I have a small pair of spring gaiters, also another larger pair, which come above the knee and protect the thighs. To these I have made the following alterations, which some may consider improvements. I first found the strap *under* the boot required very neat adjustment if the spat were to lie snugly on the boot. If loose enough to slip over the boot it was too loose to hold the spat down. When muddy it soiled the hands in undoing the buckle, and also it was a long way down to stoop (it is some time since I was able to touch my toes). Accordingly I cut out this strap altogether, and increased the size of the spat by sewing on another piece of black leather, known to shoemakers as 'Kip.' It looks rather like a car washer's clog now, but keeps the boots clean, as they are entirely covered. I found the spring alone insufficient to retain the legging securely, and after leaving one behind after a vigorous running start I sewed the two halves of a long strap just below the knee. These cross behind the knee and buckle in front where I can see them, and fasten in comfort. I find the longer leggings quite comfortable and warm enough for half an hour's run, even in cold weather. But the leather saddle strikes horribly cold to the seat. I often think a spring-on padded saddle cover would sell."

The same writer continues: "The roller blind screens to protect the legs from front wheel mud are hard to obtain of late, but I have made some very good imitations, which fasten on to a flat steel bar carried from a clip bolted to the tube above the tank, and carried at the bottom by a similar steel bar bolted on to the silencer or footrest. These are not so bulky as the tin trousers one sees on a well-known make, and do not rattle.

"When riding in the sidecar in really muddy weather, when the roads are covered in 'soup,' I find that the mud runs down to the end of the mudguard extension and then blows back into the passenger's face, in a most objectionable way. After trying several dodges, I have attached an extra section of mudguard on either side of the existing one It looks smart, and bids fair to be successful."

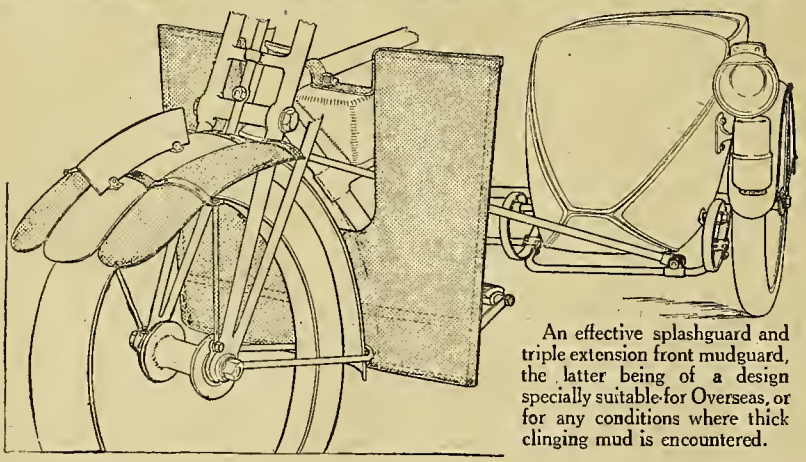
ARTISTIC SCOTT ATTACHMENTS.

THE Scott motor cycle is the only machine at present marketed with adequate leg shields as a standard fitment, although the Sunbeam and P and M. supply them to order. The Scott



The leg shields of the new Scott frame (described on page 96 last week) effectively protect the feet and legs of the rider.

shields afford an excellent example of elegant design combined with usefulness. The curves and harmony of colour of the shields give the finishing touches to the machine so far as appearances are concerned, while not only do the shields protect the rider, and indeed the whole of the mechanism from

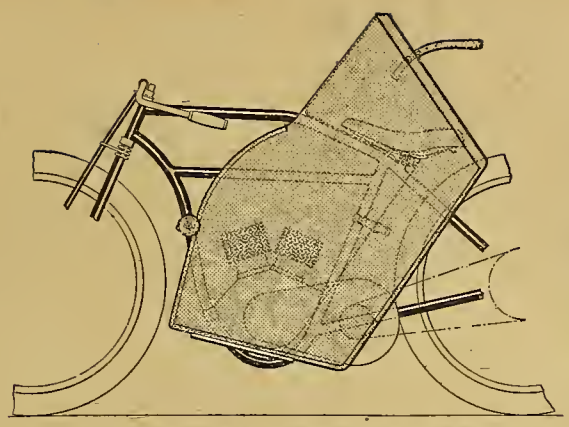


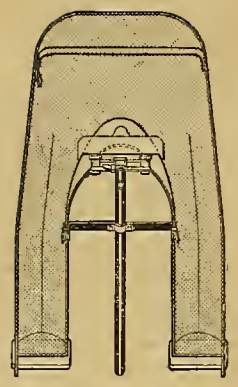
An effective splashguard and triple extension front mudguard, the latter being of a design specially suitable for Overseas, or for any conditions where thick clinging mud is encountered.

Protection from the Mud.—

road contributions, but they effectively concentrate the draught into the channels where it is required.

It is not surprising to note, then—indeed, we should have been disappointed otherwise—that in the design of his new detachable tube frame, which we described and illustrated last week, Mr. Scott has made very ample provision for the comfort of the rider. The roomy leg shields are arranged entirely to enclose the rider's legs, as will be seen from our illustration, while concentrating the current of air on the engine. Given a front wheel mudguard of sensible design nothing further is required.





A combined apron and leg shield in either leather or American cloth, adaptable to any type of machine.

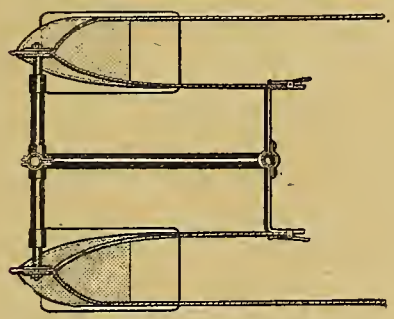
A POPULAR AND EFFECTIVE SHIELD.

A DEVICE on more permanent lines, which we have seen very extensively used in Midland towns, consists of two metal shields, which are curved to encircle the rider's feet and legs. These shields are rigidly attached to the footboards, and also by a bracket to the top bar of the machine, and afford excellent shelter for the rider's legs. They are made by Messrs. Joy and Co., of Foleshill Road, Coventry, and though the firm are at present working almost exclusively on munitions of war, they hope at a later date to be able to supply several kinds of metal leg shields.

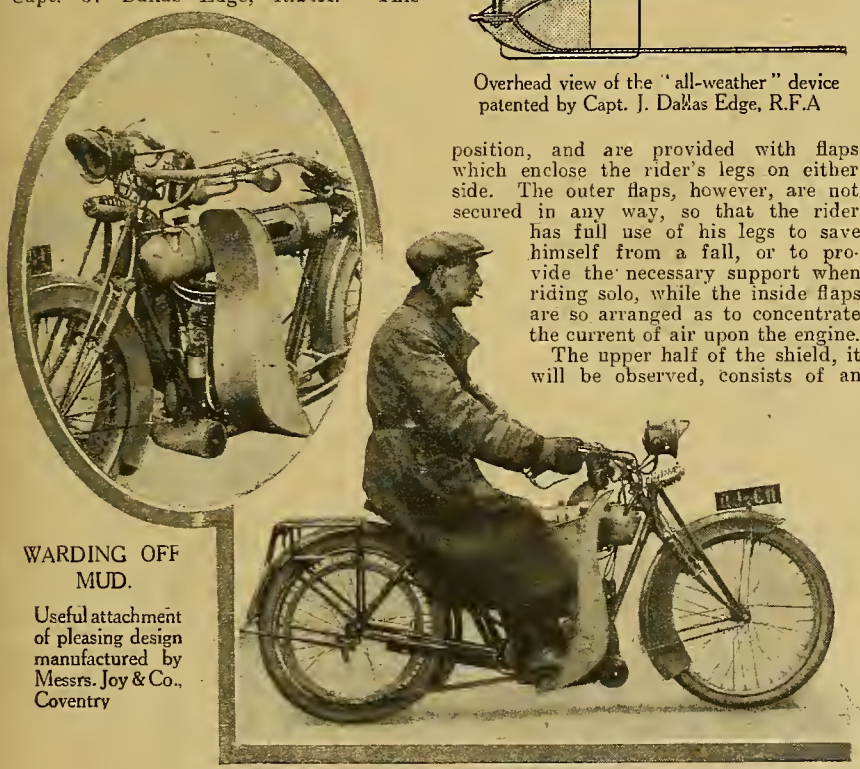
A COMBINED APRON AND SHIELD.

A SHIELD of a somewhat similar nature, only constructed of waterproof material, such as leather or American cloth instead of sheet metal, is the patented invention of Capt. J. Dallas Edge, R.F.A. This attachment is made not only to shield the legs of the rider, but also to provide protection where protection is most necessary, and it may best be described as resembling a pair of capacious overall trousers, having the legs open down the back and made to straddle the tank. These leg members are stiffened by the use of front stays so as to retain their position, and are provided with flaps which enclose the rider's legs on either side. The outer flaps, however, are not secured in any way, so that the rider has full use of his legs to save himself from a fall, or to provide the necessary support when riding solo, while the inside flaps are so arranged as to concentrate the current of air upon the engine.

The upper half of the shield, it will be observed, consists of an apron, which is strapped round the rider's body. This device will undoubtedly provide all the shelter and protection that could be desired.



Overhead view of the "all-weather" device patented by Capt. J. Dallas Edge, R.F.A



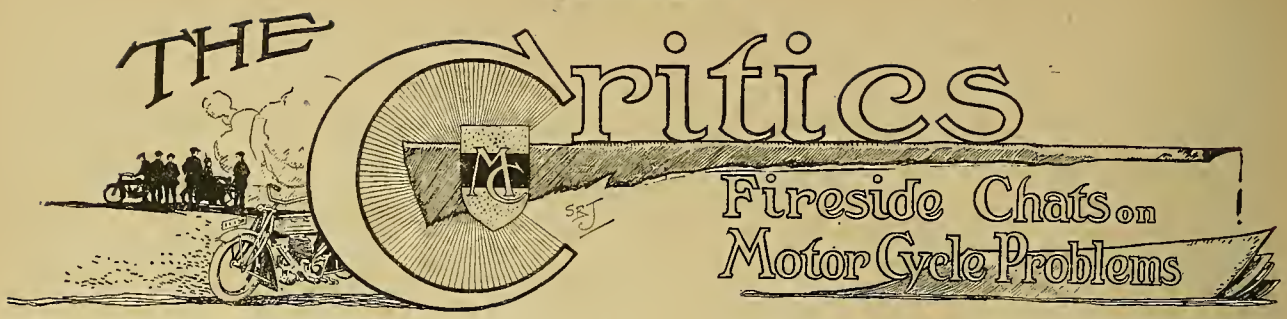
WARDING OFF MUD.

Useful attachment of pleasing design manufactured by Messrs. Joy & Co., Coventry

AVERAGE PRICES.

WE give below the average prices of second-hand models offered for sale in *The Motor Cycle*. Difficulty in obtaining a sufficient number of one particular model often arises, owing to the fact that many advertisers omit some of the most essential details.

Make.	Year	H.P.	Average for last week.	Latest weekly average obtainable
A.J.S.	1916	6 3-sp. sidecar	£90	—
"	1914	6 3-sp. sidecar	£62	—
"	1913	6 3-sp. sidecar	—	£48
"	1916	2¾ 3-speed	—	£55
Allon	1916	2-stroke 2 sp.	—	£36
Ariel	1916	5 3-sp. sidecar	—	£76
Bat	1913	8 2-speed	—	£39
Bradbury	1913	4 2-sp. sidecar	—	£30
B.S.A.	1916	4½ 3-sp. sidecar	£58	—
"	1915	4½ 3-sp. sidecar	£57	—
Calthorpe	1916	2¾ 2-speed	£28	—
Clyno	1913	6 3-sp. sidecar	—	£40
"	1914	6 3-sp. sidecar	—	£62
Counaught	1914	2-stroke	—	£18
Douglas	1916	2¾ W.D.	—	£50
"	1915	2¾ 3-speed	—	£45
"	1915	2¾ 2-speed	£45	—
"	1914	2¾ 2-speed	£38	—
"	1915	4 2-sp. sidecar	£62	—
Enfield	1916	6 2-sp. sidecar	£80	—
"	1915	6 2-sp. sidecar	—	£60
"	1916	3 2-speed	£48	—
H.-Davidson	1916	7-9 3-sp. sidecar	£83	—
"	1915	7-9 3-sp. sidecar	£65	—
Humber	1914	3½ 3-speed	£35	—
Indiao	1916	Powerplus sidecar	£85	—
"	1915	7 3-sp. sidecar	£70	—
"	1915	5 3-speed	—	£51
Ivy	1915	2-stroke 2-speed	—	£25
James	1915	4½ 3-sp. sidecar	—	£68
Levis	1915	2½ 2-stroke	£21	—
"	1916	2½ 2-stroke	£29	—
Matchless	1915	8 3-sp. sidecar	£85	—
New Hudson	1916	2-stroke	—	£34
"	1915	2-stroke	£22	—
"	1915	4 3-sp. sidecar	£52	—
New Imperial	1916	2½ J.A.P.	—	£33
Norton	1916	4 3-speed	£45	—
P. & M.	1914	3½ 2-sp. sidecar	—	£55
Premier	1914	3½ sidecar	£45	—
Rover	1916	3½ T.T.	£50	—
"	1914	3½ 3-sp. sidecar	£47	—
"	1915	3½ 3-speed	£46	—
Rudge	1912	3½ clutch	£26	—
"	1915	3½ Multi sidecar	—	£45
Scott	1914	3¾ 2-sp. sidecar	£40	—
"	1916	3¾ 2-sp. sidecar	—	£58
Sunbeam	1916	8 sidecar	—	100
"	1915	3½ 3-sp. sidecar	£70	—
Triumph	1916	4 3-sp. sidecar	—	£70
"	1915	4 3-sp. sidecar	—	£60
"	1914	4 3-speed	£40	—
Zenith	1916	8 Gradua sidecar	—	£80
"	1914	8 Gradua sidecar	£42	—
"	1915	5 Gradua	£49	—



PICTURE a discharged D.R., a successful but distinctly human manufacturer, a quick-thinking, slow-speaking, and long-experienced journalist, and a fourth individual, whom we had best refer to as the "Novice." They were seated around a fire discussing things in general and nothing in particular, when the Novice remarked that he was about to buy a motor cycle. "A double-purpose mount," he explained with an airy wave. "Something I can ride solo or take my wife about in; but I'm hanged if I know whether to get a 3½ h.p. single or a twin of about the same size."

"For a start, don't expect a 3½ h.p. to do all you want with a sidecar," drawled the Journalist. "I would buy a 4 h.p. single if I were you."

"Why a single?" asked the Novice. "I like the even purr of a twin much better, and I am told it runs much more smoothly than a single."

"If you are going to be decided by even purr," growled the Manufacturer, "why not buy a musical box and be done with it? You remind me of a reverend friend of mine who bought a horse because he liked its tail!"

"And in the end," remarked the D.R., "the selected horse kicked its tail off, just as the selected 'single' is sure to kick its belt off."

The Novice was not to be put off by cheap jokes, and meant thrashing the subject out. Turning to the Journalist, he invited more comment. "A single pulls better for its size than a twin," the Journalist told him, "though it is not so comfortable solo. A beginner can more easily locate a fault in a single, and can keep it in better tune."

"All of which we have heard before," sighed the D.R., stretching his legs to the fire. "A one-legged cyclist can bump along at a good speed, but it's beastly for the man on his step. As a matter of fact, a twin requires very little more attention than a single."

"Very little," agreed the Journalist, "but still a *little* more."

"Even so, the only advantage of the single," announced the D.R., "lies in its low compression and heavy flywheels, which enable it to slog along with optimistic determination; but it is not comfortable to ride, and, what's more to the point, *there is absolutely no suitable transmission for a big single*, and the transmission counts for everything."

What is a Suitable Transmission?

The Manufacturer was obviously bristling. "What do you mean by 'suitable transmission'?" he demanded.

"One which will absorb the terrific thump, yet give a desirably positive drive under all weather conditions."

"What about sidecar machines such as the P. and M. and Sunbeam singles?" queried the Novice.

"Great snakes!" snorted the Manufacturer. "I ought to know a bit about the subject, and I am certain that half the difference is imaginary. You hear the exhaust of a single, and with every pop you imagine a snatch. If the exhaust were silent you wouldn't talk so much about the snatch, because it is almost imperceptible without something to keep time with it. The Journalist is right in recommending a single to a novice of advanced years. Haven't the War Office bought P. and M.'s and Triumphs by the thousand because they know all sorts of men will ride them?"

"And because they knew they'd keep their tune," added the Journalist, with journalistic disregard for clear English.

"Or tear out their spokes in the attempt," mumbled the D.R., looking as though he'd trodden on the teeth of a garden rake and the shaft had jumped up and hit him on the nose.

Some Unparalleled Achievements.

The Manufacturer pointed the gnawed stem of his pipe at the discharged soldier. "You make a test on a long punishing hill," he advised. "There is no twin made which will keep on slogging like a single of the same c.c."

"What is c.c.?" mildly interposed the Novice.

"Cubic centimetres or current consumed," explained the Journalist.

"Oh!" said the Novice, stoutly, "that makes a lot of difference in upkeep."

The D.R. said it was enormous. "You don't have to keep putting pennies into the meter," he explained.

Such frivolity was beneath the Manufacturer. "Take Jack Haslam's performance on a 3½ h.p. Premier sidecar in the 1914 Six Days, or Haswell in the 1913 trials with a 3½ h.p. Triumph outfit. They both beat dozens of solo riders on more powerful machines than theirs."

"I seem to recall that George Brough put up a correspondingly marvellous performance when he went through the Scottish on a 5 h.p. twin *with fixed gear* and got a *Gold!*" observed the D.R. crushingly.

But the Manufacturer was lighting his pipe.

"I forgot to mention," modestly interposed the Novice, who realised that he had lighted a straw and set fire to a haystack, "that I haven't much money to throw about."

The Question of Price.

"Money!" spluttered the Manufacturer, eagerly seizing the point. "Then, again, buy a single. You get better value for your outlay, because it costs much less to make than a twin——"

The Critics.—

"*That,*" interrupted the Journalist, "is why manufacturers prefer it. Slip the belt on again."

"It has fewer parts and less machinery," the Manufacturer pointed out, "and is cheaper to run——"

"About ninepence a week," put in the D.R.

"As for snatchiness in the drive, you are overdoing it. There is undoubtedly more of it than in a twin, but for a novice this really is not worth consideration. A suitable shock absorber, cushion drive—even a spring frame. Just wait till the war is over!"

"Yes," said the D.R.; "you manufacturers are great on the 'just wait' proposition. You say that a single will keep on pulling on gradients, but is there anything more objectionable than that thump—thump—thump on hills? It costs you more in tyres and transmission than the difference in oil and petrol."

"You seem to forget," the Journalist interposed, "that the primary object of this conversation is to enlighten a novice, a juggins, who anyway will thump his engine till it backfires."

"Not I!" yelled the Novice. "I shall change gear at the bottom of the hill and let her rip."

"That is rather risky," pointed out the D.R., sagely. "It is apt to turn the grease in the gear box into margarine."

Keeping Up the Revs.

But to the Manufacturer life was a tense drama. "It's just as easy to change down on a single as on a twin," he pointed out. "D.R. will probably retort, 'And that transforms snatch into vibration.' True, but vibration is not an inherent defect of the single. D.R. has either tried bad samples, or has driven them jolly badly. It comes to this—will you have the offensive smell and extra oil consumption on hills of the twin, or a sticker in the shape of a comparatively cool-running single?"

The Journalist moved his chair. It was his room—his fire, his cigarettes on the table, yet he was crowded out of the cheery circle. "As for overheating," he remarked, drily, "personally I am not experiencing it. The Manufacturer would make a better leg shield than a radiator—if he really tried."

"Oh, but he's a bright spark!" observed the D.R.

"All the same, I agree with him in advising a single as a double purpose mount for a beginner," the Journalist went on. "But I certainly do not back up his statement that vibration is not an inherent fault of the single. A single cannot be properly balanced, so we have to depend upon the transmission for making up what the engine lacks. Hence D.R.'s statement that there is no *suitable* transmission for a big single."

The D.R. graciously handed the Journalist one of his own cigarettes, and at this juncture the Novice announced that he was rather more smitten with the idea of a single. Retention of power he considered a big advantage. "And tinkering," he added, "is not much in my line."

"No," agreed the D.R., his eyes upon the comfortable amidship dimensions of the Novice, "it is apt to burn one's waistcoat."

"But," added the Novice, "what about transmission troubles in wet weather?"

The D.R. looked at the Manufacturer and groaned. At length the Journalist rose to the occasion. "I should say you will have them if you decide upon a single with any form of belt drive," he announced. "But they will not be painfully frequent."

"And snatch?" queried the Novice. "Can I obtain a single which will be devoid of sn-atch?"

"No!" bellowed the D.R.

"Yes!" growled the Manufacturer.

"Snatch is not noticeable, except at low speeds," announced the Journalist.

There was a long silence, the only sound to be heard being that of the Journalist's dog scratching himself under the table.

"Decided what to buy?" queried the Journalist.

The Novice brushed his capacious waistcoat. He was still uncertain, but one demand he knew would be answered definitely and promptly. "Kindly pass the water," was his final request.

WITH MOTOR CYCLISTS ON THE FRENCH FRONT.

Telegraph, telephone, and motor cycles are by no means the only methods of communication in warfare. The exclusive photographs reproduced were taken in the Champagne sector. (Inset) False batteries originally made to deceive the German airmen, but by now well known to them. The Triumph belongs to a despatch rider attached to a famous 75 mm. French gun battery. (*Passed for publication by the French War Minister.*)

Induction Pipe Design.

MOTOR cyclists in general must tread cautiously where the experts are quarrelling, but it seems to me that the controversialists are inclined to confuse two very different factors in inlet pipe design, namely, the temperature of the pipe and its length. I have heard our best designers assert *ad nauseam* in public and private that long induction pipes are the best. Mr. Bradshaw is only saying what I heard Mr. W. Wells say in the old Vindec days (? 1905 or thereabouts). He remarked at a club discussion that he had made bench tests of the 5 h.p. Peugeot engine, in which he was then interested, with inlet pipes ranging from the minimum practicable length up to about 5ft., and that the longer the pipe, the better the carburation in respect of power, acceleration, and economy. But, as modern practice, *e.g.*, on the Triumph, shows, a warm inlet pipe and a warm carburetter are also essential; and, if we adopt a long inlet pipe without any provision for heating it, we may score a trifling advantage in summer, only to lose it and a bit more in winter. A long inlet pipe, in conjunction with heating, secures all the possible advantages.

Capt. Lindsay on the Subject.

AS Capt. Lindsay is dragging me into this controversy, let me describe my experiments in "lagging" the inlet pipes of flat twins. I have two such machines at the present moment. Both have long inlet pipes. One has a two-lever carburetter with a heating system which I can only describe as rather makeshift and inadequate; the other has a single-lever automatic carburetter with a very efficient heating system. I have tried both machines, with the induction system heavily lagged and unlagged; and I have tested both machines over many thousands of miles, alike in summer and in winter. The imperfectly heated long pipe behaves admirably in summer; in winter it is very sluggish at first starting out, whether lagged or unlagged; when lagged, it produces its best running much sooner in cold weather, and apparently runs slightly better for the lagging, even when it is warmed up to its natural limit of temperature. In other words, it benefits from inlet pipe protection, simply because its carburetter is not sufficiently heated. The other machine, having a more generous system of exhaust heating for the carburetter, shows no benefits at all from being lagged; lagged or unlagged, it misfires and is apt to choke in all weathers when first started up, simply because its carburetter is adjusted for a hot air supply and no hot air supply is present until the engine has warmed up its exhaust pipe, and because no adjustment is available to correct the initial absence of hot air. In other words, the motor car type of carburetter behaves on this engine exactly as it behaves on a motor car, and exactly as it behaves if bolted up to the stub inlet pipe of a 4 h.p. Triumph. There is not a word to be urged against the long inlet pipes of flat twins provided they are adequately heated, and this can be done at a manufacturing cost of about 6d. per machine. The 2in. stub inlet pipes of many popular single-cylinders are efficient, not because they shorten the travel of the incoming gases, but because they conduct heat to themselves and to the carburetter; the single-cylinder engine would not show a less efficiency if its inlet pipe were a foot long, provided the pipe and carburetter were kept as hot as the present types.

Motor Cycling and Toothache.

THE medical article in our issue of January 25th reminded me vividly of a time when I was on the point of abandoning the motor cycle, because of the violent toothaches generated by each cold or windy run. Finally I solved the difficulty by making it an absolute rule to visit the dentist once a quarter, whether there were signs of toothache or not. I can recommend this dodge for people whose teeth need retuning at frequent intervals; it saves money, it preserves the teeth as incipient decay is nipped in the bud, it ends toothache, and it prevents a ride or a tour from degenerating into misery on occasions. To wait till a tooth aches before visiting a dentist is really as silly as waiting till a piston seizes before lubricating it. But we were never a logical people. The Chinese pay their doctors when they are well, and the doctor's money ceases while his patient is ill. Perhaps when the Chinese really take up motoring they will hire their motors from makers and agents, and the instalments will be suspended when the motor won't go!

Steel Radiating Fins on Iron Cylinders.

MOTOR cyclists who have not previously seen an A.B.C. always comment on the beautiful evenness and extreme thinness of the radiating fins on my engine. There is naturally a marked contrast between the cast fins of an ordinary iron cylinder and the machined fins of a cylinder which is turned out of the solid steel ingot. But the latest news from America indicates that it is possible for a manufacturer to retain the conventional cast iron cylinder, and yet to have machined steel fins of paper thickness. The air-cooled Franklin car has a six-cylinder engine with overhead valve gear and vertical fins of machined steel. The fins are placed in the mould before the molten iron is poured in to cast the cylinder barrel. It might even be possible to go one better, and to incorporate machined aluminium fins on cast iron cylinders. This should give us very high efficiency in cooling, whilst adding little to the cost of the engine.

MILITARY NOTES.

NEWS OF MOTOR CYCLISTS FROM FAR AND NEAR.

Flight Sergt. R. S. Scoon in flying regalia.

IN THE FLYING SERVICE.

R. S. SCOON will be recalled by many readers as a prominent member of the Newcastle and District Motor Club, and a frequent competitor in North-country reliability trials. He mostly rode a Nut-Jap. Scoon is now a Flight-Sergeant, and was recently home on seven days' leave, during which period he took the opportunity of tying himself up in matrimonial bondage. Scoon is stationed at a flying school in England, and is connected with the instructional staff.

FROM AGENCY TO REPAIR SHOP.

JACK MILLS, who was so well-known as a competition rider prior to the war, has lately been promoted to the rank of Lieutenant R.N.V.R., and is in charge of a repair depôt attached to an R.N.A.S. Transport Section.

A NAVAL WEDDING.

FLIGHT-LT. JOHN FORGAN POTTS, who previous to the present crisis was a frequenter of Brooklands track, on which he used to race on an Indian, and who is a motor cyclist of long standing, was married at Brompton Oratory to Mlle. Lucotte Bultinck, a Belgian lady. We wish the happy pair all success and prosperity.

THE SILENT TANKS.

A GUNNER in the Heavy Section, M.G.C.—the section operating the Tanks—remarks that they are in winter quarters, as will be gathered by the absence of mention of the Tanks in the official *communiqués* of late. They are experiencing quite a change away from the noise of guns, but are nevertheless kept busily occupied "tuning up" the engine, chassis, and transmission. "My word, the oil and grease we use! We are far better off than the infantryman, who has to spend his time knee deep in mud and water," he writes. "As a matter of fact, though many people imagine the Tanks to be dangerous, I would not care to transfer to any other corps. It is the infantry who are winning, and will ultimately win this war. We men of the Tanks often admire the bravery of the men who fearlessly dash over the parapet with bayonet fixed. Why, again, compared to bombing expeditions, a cruise on a Tank in the enemy's lines with plenty of protection is as nothing."

EX-WORKS MANAGER IN HOSPITAL.

SGT. PETER MOSS, who may be remembered by Midland motor cyclists owing to his connection with the motor cycle department of the Premier Co. is in an English military hospital suffering from rheumatic fever. Moss joined the Motor Machine Guns over two years ago, and was quickly promoted to sergeant. He has been employed at one of the repair bases in France for some time past.

R.F.C. MOTOR CYCLIST RECRUITS.

WE have received a grateful letter of thanks from Maj. R. Mitchell, R.F.C., The Polytechnic, 309, Regent Street, London, W., for the work done by *The Motor Cycle* in obtaining recruits for the Royal Flying Corps. Motor cyclist recruits over 19 years of age, and in medical categories A or B1, are still needed. There are also vacancies for Motor Transport drivers in medical categories B1 or B2.

A DARING AIRMAN.

MAJ. F. W. GOODDEN, R.F.C., who was killed while flying last Sunday week, executed some sensational flights on the occasion of the last R.A.F. motor cycle race meeting held in October, 1915. While the competitors were waiting at the end of the straight previous to a race he flew down the track, turned round, and sailed down the straight again just ahead of them. Not noticing the wires running from the club buildings to the timekeepers' boxes, he crashed into these and smashed them, narrowly escaping death in so doing. Immediately after this he banked sharply to the left and climbed steeply over the club buildings. Maj. Goodden was an exceedingly skilful flier, and will be sadly missed at Farnborough

"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

A MESSAGE FROM MESOPOTAMIA.

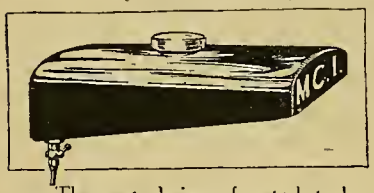
AMONG our correspondence last week was a letter from that well-known L.M.C. exponent, Sgt. Leonard A. Bees, who, it will be recalled, enlisted in the Motor Machine Gun Service in 1915. He is now in Mesopotamia driving an armoured car, and attached to his battery is a large number of Douglas motor cycles, which are receiving a thorough testing in the heat and the sand. The motor cycling conditions in Mesopotamia have been enlarged upon in these columns by Cpl. A. J. Sproston, the heat and the sand being particularly trying both to riders and machines. Sgt. Bees's letter, dated November 14th, was intended as a New Year wish to his friends, and he winds up his interesting communication with the hope that motor cyclists may be reunited at a show next November.

An unofficial photograph showing the "straffing" of a Triumph motor cycle by boys of the R.F.C. The pose is becoming rather too common in military circles and shows a manner in which motor cycles were never intended to be tested.

THE SIMPLEX POWER UNIT.

Another Promising Development in the Direction of the Motor-assisted Pedal Cycle.

AS long ago as November 18th, 1915, we reviewed in these columns a clever attempt to solve the problem of the mechanically-assisted pedal cycle. Its originality was evident, and, despite certain doubtful departures from accepted methods, it promised well. In the interim the design has been considerably advanced beyond the patent stages—one or two experimental models are actually in being—and but for the fact that the British Army requires all the shells it can get, this interesting little motor would be on the market in large numbers. Agencies have already been arranged for export to Overseas markets, and the numerous enquiries regarding it which followed our description of the original design show the interest evinced. We illustrate the attachment as fitted to a New Hudson cycle for testing purposes, and whilst the later models will embody several alterations in detail, the general design remains the same. The first noticeable feature is that it is a *complete* unit, the only separate parts being the controls and the driving chain ring. No alteration to the cycle is needed, and the average cyclist with a little mechanical "gumption" could fit it to his machine in a very short time; an expert mechanic might do the job in five minutes.

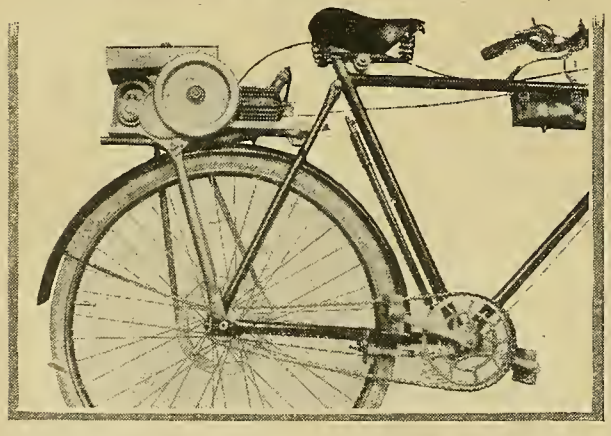


The neat design of petrol tank intended to be fitted on later models. Note the filler cap, which forms the lubricating oil measure.

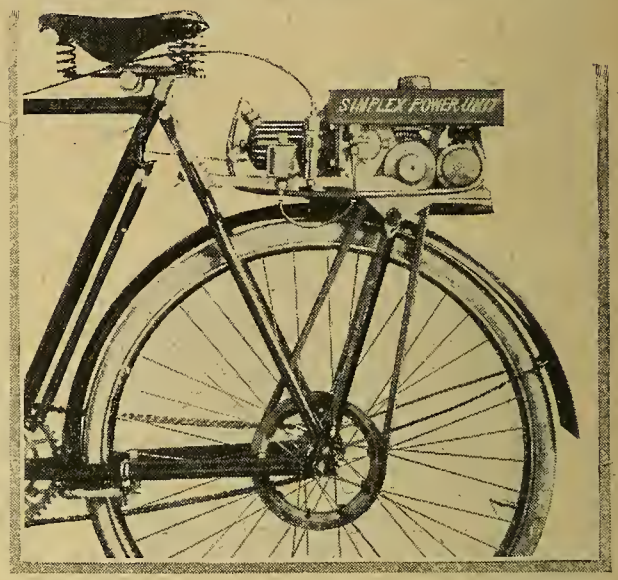
The bedplate for the unit is an aluminium frame of girder pattern, supported at three points, one coupling to the back stays below the saddle, and two oval tubes to the back axle, where they are carried on special nuts, somewhat like the usual cycle mounting step.

The Two-stroke Engine.

A simple three-port two-stroke engine, placed horizontally (capacity about 2in. × 2in., giving approximately 1 to 1⅛ h.p.), drives by gearing to a countershaft carrying a small clutch, continuing by belt to the back wheel. It is geared down to about 10 to 1.



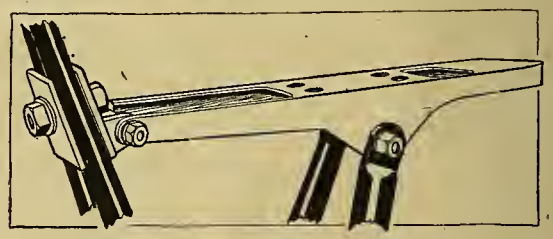
Flywheel side of the 1 h.p. Simplex conversion set.



Simplex power unit, which, as will be seen, is mounted on an aluminium bracket in place of the usual carrier.

(The experimental models are belt-driven, but this transmission will give place to a chain and sprockets.)

The double cone clutch controlled by a handle-bar lever is very efficient in practice. The engine can be started by a pull on the flywheel, the clutch let in gently, and the power is sufficient to get away from a standing start on the level. A small type M.L. magneto, gear driven in the same train of wheels as the main drive, supplies the spark. The carburetter is still to be decided upon, the inventor being engaged in perfecting a special design to suit the small engine. The exhaust is carried to the rear to a small silencer, and the usual sound is nothing but a gentle "purr."



The aluminium carrier bracket, supported at three points, on which the whole unit is assembled.

Great Accessibility.

The tank illustrated is only a temporary affair. The finished article, holding three pints, will be lower, with a rounded top and flat end to take the registration number. Lubrication is by the petroil system for simplicity, the filler-cap cover serving as a measure of the correct amount to a full tank.

Accessibility is a special feature. By removing four bolts the upper half of the crank case can be removed, and the whole crankshaft, flywheel, connecting rod, and piston can be lifted out at once. The release

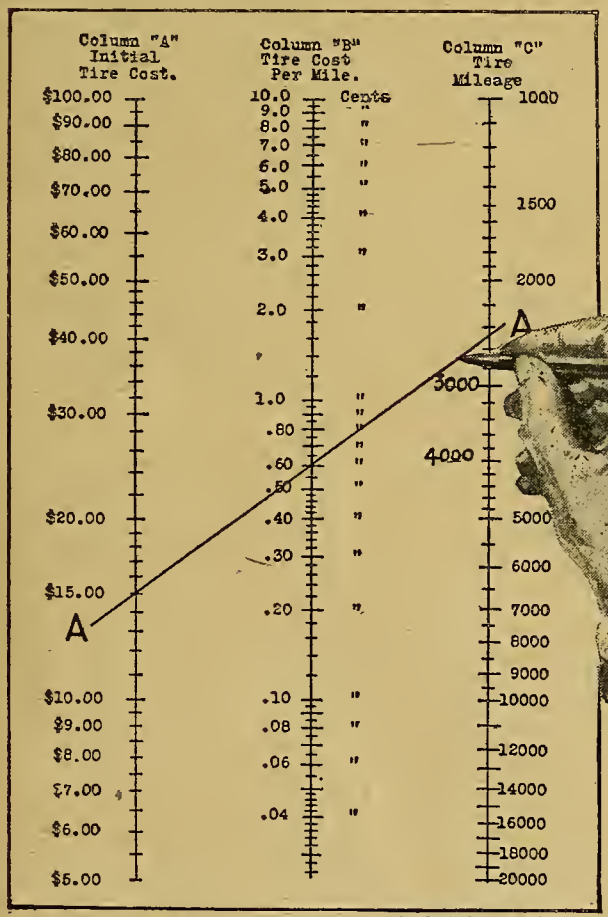
The Simplex Power Unit.—

valve is coupled up to the throttle control cable so that it opens immediately the throttle closes.

The total weight of the unit will be under 20 lb., and the price is not likely to be over £10. At that figure it should be within the reach of all and sundry. The overall dimensions are 16in. × 8in. × 8in. As to its capabilities, we shall speak in a later article, when we have had time to test it properly, but we are informed, and we have no cause to doubt, that it will carry an average rider on the level at a good 16 m.p.h., only requiring pedal assistance on stiffish hills; it has climbed easy slopes of about 1 in 15 at 9 to 10 m.p.h. without assistance. It is interesting to note that the whole unit can be easily held up in the hands whilst running at over 2,000 revs. per minute. Whilst there are numerous points of doubt which one can raise, such as the position of the weight affecting stability (the inventor assures us that this is not felt when riding, any more than a touring kit on the carrier), yet it most certainly forms a very attractive addition to the pedal cycle. Particularly among those who, through advancing years, may be tired of pedal pushing on long journeys, it should find a ready sale when a return to normal business permits its manufacture.

A Tyre Mileage Cost Chart.

THE accompanying chart, which is being distributed by an American motor tyre manufacturer, is designed to show at a glance the cost of tyres per mile. If a thread be stretched across the chart, or a line drawn as A A, from the point on the left which indicates the cost of the tyre to the point showing the mileage on the right, it will cut the centre column at the point which gives the cost per mile.



A chart by means of which one may quickly find the actual cost of a tyre per mile.

For instance, if a tyre cost 15 dollars (£3 2s. 6d.), and ran 2,500 miles, the cost per mile is shown to be .6 cent (.3 pence); or again, a motor cycle tyre costs £2 1s. 7d. (10 dollars) and runs 8,000 miles, and the cost per mile will be approximately .06 pence (.12 cent). The chart being American is calculated for dollars and cents, but these are easily reduced to English coinage when it is remembered that a dollar equals fifty pence and a cent is the equivalent of a halfpenny.

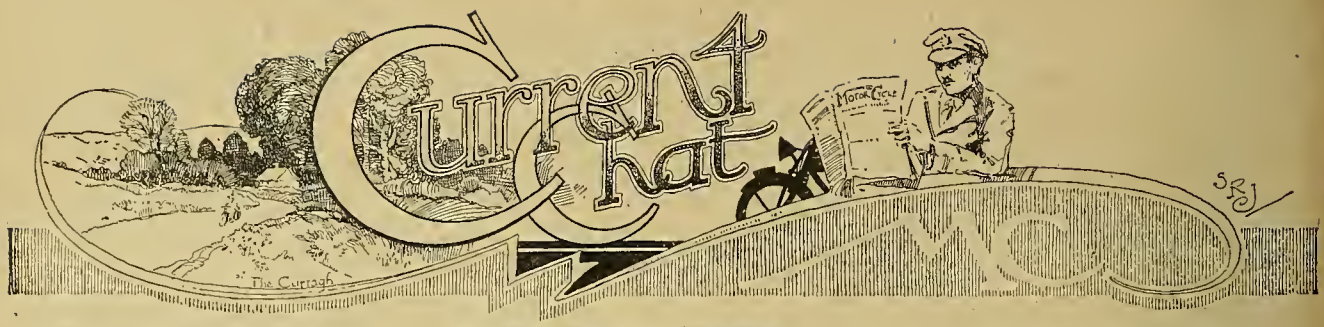
SENDING A MACHINE BY RAIL.

EVERY motor cyclist dislikes the expedient of sending his machine by rail, but it is one of those events which arrive, sooner or later in the unhappy lives of all of us.

When I am compelled to send my machine by rail I always turn to my old friend, the roll of insulation tape. By long application I have become an adept in the use of the "sticky roll," and my first act is to bind the change speed lever in the neutral position by means of a few dextrous turns. This habit I acquired by once watching a perspiring porter push a 6 h.p. A.J.S. the entire length of Birmingham Station with the back wheel skidding—owing to the fact that the gear lever had been knocked into the low gear position. The event was bad for the porter but worse for the tyre, and therefore I first make sure that no such Olympic feats will be necessary with my machines.

The next move is to bind the handle-bar control levers to the bars, for one of the commonest mishaps is for these levers to be knocked inwards or outwards beyond their extreme range, so that the machine finally arrives with the controls bent or broken. This hint was learnt by sad experience when, on one occasion, after a journey by rail, I had to "blind" through a long trial with the throttle lever snapped off short, and slowly but surely eating a hole through my glove and into my first finger.

If one has carefully "emptied" the tank with the machine on the stand, it may further be as well securely to bind the tap in the "off" position, so that danger of fire from a flooding carburetter, owing to the position of the machine in the van, is eliminated.—B.



TIMES TO LIGHT LAMPS

GREENWICH TIME.

Feb.	8	... ...	5.28 p.m.
,,	10	... ...	5.32 ,,
,,	12	... ...	5.36 ,,
,,	14	... ...	5.40 ,,

Trading with the Enemy.

A supplement to the *Board of Trade Journal* of February 1st contains a complete list of the names of firms which have been ordered by the Board of Trade to be wound up under the Trading with the Enemy Amendment Act, 1916.

British Magneto Factories.

Many of our readers would be much surprised at the enormous size of some of our new British magneto factories. One we recently visited is a veritable sky-scraper, employing many hundreds of hands and the finest scientific apparatus.

A Notable Appointment.

Mr. Wilfred Hill, a leader in the motor cycle world, and director of the County Chemical Co., Ltd., and the Calthorpe Motor Co., Ltd., has been appointed by Mr. Neville Chamberlain to an important post at the National Service headquarters.

Broken Frames in the Army.

Mr. Alfred Scott points out that it is estimated that 50% of the machines employed in France at any one time are out of action owing to frame breakage. Very often the smallest fracture necessitates a machine standing idle for many days, or may even necessitate its return to the factory of its origin. Mr. Scott tells us that one of the primary objects of his new frame (which we described in last week's issue) is to overcome this difficulty with regard to repairs. By his system a broken frame need not necessitate a delay of more than a few minutes

Club Premises Commandeered.

In a letter we have received from Mr. Arthur Stanley, chairman of the Royal Automobile Club, reference is made to unjust comments recently made in the press with regard to the taking over of the Royal Automobile Club by the Government. The representation that some of the members of the Club have, for their own comfort, endeavoured to oppose the commandeering of the Club premises is, writes the Chairman, contrary to truth. The letter refers to the valuable work done by the Club since the outbreak of war, and cites the fact that out of 16,000 members 11,000 are now in the Army or Navy.

Further Repair Work Impossible.

We have been requested by Messrs. Norton Motors, Ltd., to state that they much regret that, until further notice, they are unable to undertake further repairs to their machines, the whole of their plant and *personnel* being engaged upon work for the Ministry. In the meantime, however, they will be able to supply a limited number of spares.

The Russian Government and Overseas Models.

The specification laid down by the Russian Government has forced many British manufacturers to alter their designs in a way that will be truly beneficial to Overseas riders. Among other things an overall ground clearance of 6in. is stipulated, and many leading British manufacturers are now building their machines on lines which will put an end to most of the ancient Overseas grumbles.

What's the Price?

There was an amusing sequel to the first trial run of the small motor attachment for pedal cycles, which we describe on another page. An experimental model had been puffing merrily around the streets in the neighbourhood of its birth, and, be it whispered, without number plates, when shortly after the trial a police-constable walked with impressive dignity into the works. Naturally, those responsible anticipated trouble, especially when, in a firm voice, the gentleman in blue observed, "You've been running a motor about here this morning, haven't you?" The makers humbly acknowledged the fact, at which the constable brightened up. "May I have a look at it?" he enquired mildly. "It seems to be just the thing I'm wanting. What's the price of it?"

Prisoners of War for the Roads.

For a long time *The Motor Cycle* has advocated the employment of German prisoners for the rebuilding and repairing of our roads, once the pride of Europe, which have suffered so grievously through heavy traffic since the beginning of the war. We recently mentioned that prisoners are now at work on the roads, and the latest is that the Exeter Road is to be improved, and, in great part, rebuilt by German prisoners of war. Curiously enough, about a hundred years ago, at the time of the Napoleonic wars, French prisoners interned at the camp in Dorset were given a similar job to do, and made the magnificent stretch of road from Dorchester to Weymouth, with its remarkable avenues of chestnut trees, and also worked hard on the section of main road between Wareham and Bridport.

SPECIAL FEATURES:

SPRING SEAT PILLARS.
PROTECTION FROM MUD.
A MOTOR-ASSISTED BICYCLE
(Illustrated).

Skating.

Skating is seasonable, as we recently found out when trying to ride a big single on a certain famous stretch of the Great North Road. Contortionism may be a specialised business, but we surpassed all specialised efforts in an endeavour to maintain our equilibrium.

Some Skid!

Figure eights may be all right, but we touched eight hundred—the performance giving out only when we were compelled to clutch a telegraph post—not for support, but for breath. Some skid!

The Rink of Great Britain.

The Great North Road under the prevailing conditions is the rink of the land, but the motor cyclist to appreciate it needs to have roller skates attached to his footboards.

Lady Competition Rider's New Post.

Mrs. Hardee, secretary of the Woolwich M.C.C., has, we are told, accepted the situation of forewoman at a leading firm of motor cycle manufacturers. She will supervise the woman labour in one of the shops.

New Lighting Regulations.

We mentioned certain amendments in the lighting regulations last week. It is now permissible for cars to use electric or acetylene side lamps having lens fronts, in company with head lamps screened with tissue paper. Such side lamps must, however, be similarly screened.

The A.A. informs us that its booklets explaining the lighting regulations are being revised and brought up to date, and that copies may be had gratis on application to the head office, Fanum House, Whitcomb Street, E.C.

Common Courtesy.

There are many little courtesies of the road which it is to be feared a large number of motor cyclists are not very particular in observing. We have many times seen a rider pass a lady driver in traffic, and at a time when it was hardly courteous to take the liberty, though the rider may have every confidence in the safety of the procedure. Still, it is as well to remember that lady drivers may not be quite so confident as men, and an unexpected passing may have regrettable results.

The National War Funds.

At the week-end the principal war funds stood as follow :

The Prince of Wales's Fund (distributed £3,529,719)	£6,024,994	0	0
Red Cross Fund	6,107,990	13	3
Tobacco Fund	124,887	0	0

An Old Hotel Improved.

The Crown Hotel, Amersham, which used to supply *The Motor Cycle* teas to the competitors in the old Quarterly Trials, has been taken over by the Home Counties Public House Trust. It has been greatly improved internally, oak panelling had been discovered, and it has been refurnished and renovated.

Wild Life of the Waysides.

Truly the war penetrates to every scene of life, for country riders must have noticed the enormous increase of vermin since "the man of the gun" has taken to bullets instead of shot. We have recently seen hawks in veritable droves, while one can hardly take a ride over quiet country lanes without noticing one or more stoats or weasels.

Another Motor Cycle Theft.

A 1912 T.T. B.S.A. motor cycle was stolen from behind the Golf House, Belton Park, Grantham, on January 25th. The registration number of the machine is C 5462, the frame number 1,576, and the engine number 1,704. The machine is the property of Gunner W. Evers, Motor Battalion, M.G.C.

This is by no means the first theft that has taken place recently in localities where large bodies of men are assembled, and owners of machines will be wise to avoid unnecessary risk.

Re'arding Progress.

We have received a letter from Mr. Loughborough, secretary of the Auto Cycle Union, in which he sets forward the facts of a case which is of some interest and importance. A member of the Union was recently summoned to appear at the Kingsway Police Court charged with exceeding the speed limit and with contravention of the silencer regulations. To the first charge he pleaded guilty, but the second appears to have been founded on the fact that one of the police constables was able to poke his stick into the silencer, thus proving that it did not contain baffle plates. The silencer consisted of an unusually long expansion chamber, and Mr. Loughborough informed the Bench that, as proved in the silencer trials held by the Auto Cycle Union in 1913, the most efficient form of silencer was a long, plain expansion chamber, and that this type was now fitted to many leading makes of cars and motor cycles. Having had the machine driven before him at all speeds, Mr. Loughborough stated on oath that it was one of the quietest motor cycles he had heard, but the magistrates refused to hear the machine running themselves, so the motorist was fined, and his licence endorsed "For using cut-out, 10s."

Mr. Loughborough states that should any similar summons be issued in future he would be glad to be at once informed, in order that the A.C.U. may do everything possible to prevent a reading of the law in a manner which may tend to retard the progress of design.

The hard dry roads of the past fortnight suddenly gave place at the week-end to thick snow. But motor cyclists—particularly in munition areas—were not deterred by these conditions.

Lighting Restrictions on North-east Coast.

We have received from the hon. organising secretary of the North-eastern Automobile Association a copy of the Lighting Restriction map just published by that Association. The map, printed in pamphlet form, shows at a glance the necessary information.

Entertaining the Wounded.

Five hundred and sixty wonnded soldiers were entertained by the members of the Motor and Cycle Trades of Manchester District, who banded together as a result of a suggestion appearing in *Cooper's Vehicle Journal*. In addition to this hnge company, 140 men who could not leave their wards had their share of the repast sent to their wards. Many well-known artistes took part in the concert, and the event passed very merrily.

Lodge Plugs now Unobtainable.

Messrs. the Lodge Sparking Plug Co., Ltd., inform us that, in accordance with instructions received from His Majesty's Government, the whole output of the Lodge sparking plng factory has to be reserved for urgent national requirements. The company therefore regret that in fnture they will be unable to supply plugs (except for export) to orders unless accompanied by Munitions of War certificates, either Class A or Class B.

The Cycle and Motor Trades' Benevolent Fund.

At the monthly meeting of the Executive Committee, the Hon. Treasurer's report showed a balance at the bank and in hand of £2,881 13s. Since his last report, a further £2,000 had been placed in Government securities, bringing the total of the invested funds well over £25,000. During the past twelve months the Fund's assets have increased by over £4,000—testimony alike of the large-heartedness of the trade and the careful management of the committee.

Chars-a-bancs to be Dry Docked.

An Order was issued on Tnesday prohibiting the use of petrol or petrol substitutes in motor chars-à-bancs or similar vehicles on excursions or trips.

Motor Cycle Volunteers Wanted.

We are advised that a large number of motor cyclists are required by the National Motor Volunteers (London area). Applications should be made to the Commanding Officer, D. F. Doland, Room 5, The Polytechnic, 309, Regent Street, W.

A 1 h.p. Motor Attachment.

The motor attachment for pedal cycles illustrated and described in this issne will prove of particular interest to those pedal pushers who are advancing in age. Incidentally, it is not the only design of motor attachment on the *tapis*.

Manufacturers and the War Loan.

Messrs. Rudge-Whitworth have snbscribed £50,000, Messrs. Douglas Bros. £200,000, the Triumph Cycle Co., Ltd., £53,000 (£10,000 new money), and the Coventry Chain Co., Ltd., £25,000, to the War Loan

An Indian Club Affiliates.

We are informed by the secretary of the Auto Cycle Union that the Kirkee Motor Cycle Club (Poona, India) have applied for affiliation to the governing body. The club apparently is quite a live institution, and it is good news to hear of clubs affiliating in these strenuous times.

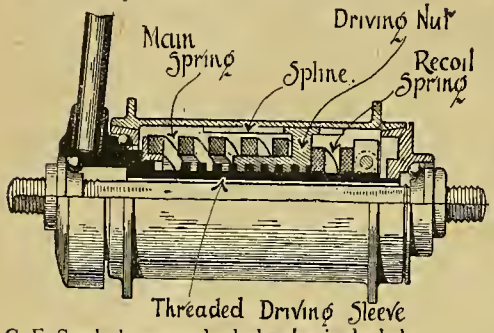
A Government Order.

New Imperial Cycles, Ltd., Imperial Works, Princip Street, Birmingham, have received a large order for 8 h.p. New Imperial motor cycles from the Ministry of Munitions, which will, for the present, very considerably restrict their output of New Imperial light tourist machines and other motor bicycles turned out by them.

AN INGENIOUS SPRING DRIVE.

WITH the usual type of spring shock absorber, the amount of movement of the driving element in relation to the driven element is small, with the result that very severe shocks are not completely damped out.

The construction here illustrated, which is the invention of Mr. G. E. Stanley (Patent No. 18,042/15), provides a considerable amount of relative movement between the driving element (which in the instance shown is a spoked belt pulley) and the driven element, *i.e.*, the hub shell. The belt pulley is carried on a long sleeve mounted on ball bearings on the wheel spindle, and the exterior of



G. E. Stanley's patent shock absorber in the hub.

this sleeve is formed with a coarse screw thread on which works a nut. The nut in turn engages splines in the hub shell, and on either side of the nut are arranged springs, the larger of which acts as the main cushion, whilst the smaller takes the recoil and comes into action when the cycle is driving the engine.

In operation, assuming the machine to be stationary, directly the belt pulley rotates, the driving nut first compresses the main spring until the resistance of this spring becomes greater than the load. Further screwing of the nut on the threaded sleeve therefore ceases, and the splined connection rotates the hub shell. Fluctuations in the driving effect and the load are therefore absorbed by the springs, and doubtless some of the power absorbed is given back to the nut when the action reverses.

The whole device is self-contained, and can be fitted and removed in just the same manner as an ordinary wheel hub.

AN ENDURANCE RUN IN INDIA.

MR PERCY JOHNSON, who is shown in the accompanying photograph on his H.-D. outfit, recently undertook a journey of 625 miles in seven days through the Bengal coalfields—not a record, but quite a worthy feat when heat and the inconvenience of Indian roads are taken into account.

Mr. Johnson, who drove the machine, with the native *mistri* as passenger, writes that "one morning an attempt was made to start out in a cyclone, but, being very nearly blown over a high and very long bridge, it was decided to rest that day." The run was undertaken in order to demonstrate to colliery managers and their staffs the possibilities of the motor cycle for covering long distances on all sorts of roads.

Frequently it was necessary to ride over quagmires and through water, and the trial appears to have been one of great severity.

Mr. Johnson was at one time connected with the advertisement department of *The Motor Cycle*.

EMPIRE OVERSEAS SIDECARS.

THE attention of Overseas readers may be called to one or two points additional to our article of last week (page 108) dealing with these special sidecars.

The bodies are built of metal under a patent (No. 26,867) process, which, it is claimed, renders them impervious to climatic conditions and capable of withstanding very rough usage. Another feature is the use throughout of castellated nuts fixed with cotter pins. This is a point often demanded by correspondents of *The Motor Cycle*, and is, incidentally, a part of the standard specification of the Russian Government, and we are glad to observe the increasing attention given to it.

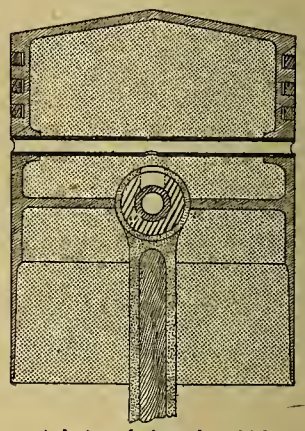
ROUNDED UP.

IN our issues of Dec. 14th and Jan. 18th we reported thefts cleverly carried out by a man in uniform wearing shoulder letters of the 7th Lancers—though no such regiment exists—and bearing, as reference, letters from his C.O. A clever ruse on the part of the police, alleged to be in the shape of an advertisement, brought this enterprising gentleman post haste into the arms of justice. Wearing the uniform of a trumpeter (says the *Daily Mail*) of the Lancers, from which he was said to be a deserter, Harry Moon was at Lambeth on the 31st ult. given six months' hard labour for stealing three motor cycles.

LUBRICATING THE GUDGEON PIN.

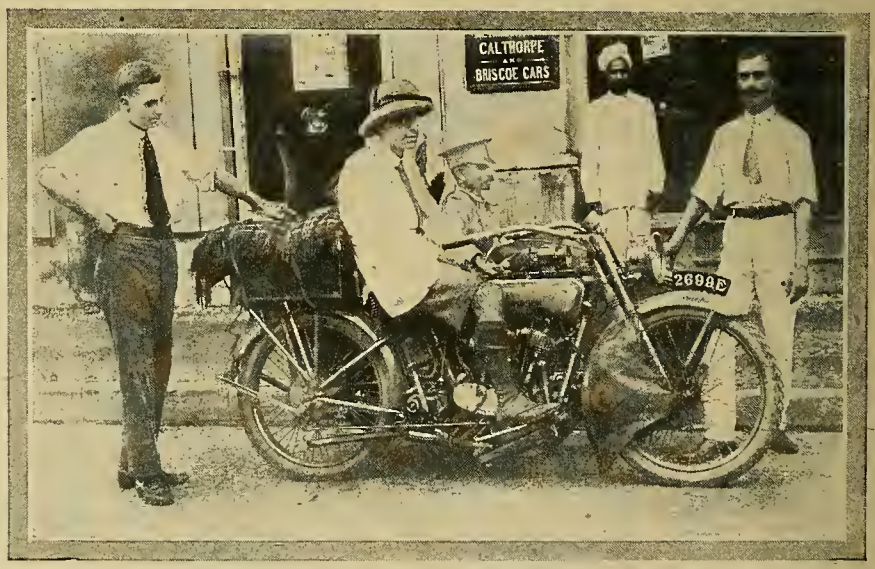
THE Albion Motor Car Co., Ltd., Scotstoun, have recently patented a new piston design, by which constant lubrication of the gudgeon pin is provided. From the accompanying drawing it will be seen that immediately above the gudgeon pin there is a small tube placed transversely across the piston, which is fixed by having its ends expanded or by other suitable means. Communication with the tube is by a groove round the circumference of the piston.

It is claimed that oil collects in this



A design of piston by which constant lubrication of the gudgeon pin is provided.

groove, and when the explosion of the charge takes place this oil is blown inwards through the tube and out through an orifice on the under side of the tube, which is directly over the small end and bush of the connecting rod in which an orifice allows oil to reach the gudgeon pin. Whilst the design reviewed is primarily intended for car engines, it would serve equally well for engines having the splash system of oiling.



Percy W. Johnson on a Harley-Davidson outfit on which he recently accomplished a tour of 625 miles round the Bengal coalfields. (See paragraph.)

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

EASY STARTING ON COLD MORNINGS.

Sir,—In the Arctic weather we have had here (Dublin), I have found some trouble in starting a 5-6 h.p. twin. Since trying a tip I saw some time ago, I start first kick with ten degrees of frost. The tip is to use a mixture of methylated ether and petrol in equal parts and prime cylinders with this. Very little does, and it is worth the cost (about threepence or fourpence an ounce). This tip does not seem to be well known. R. L. BOYD.

[This tip has frequently been mentioned in our pages by "Ixion" and others.—ED.]

COMMENTS ON THE POST-WAR MATCHLESS.

Sir,—In recent issues of *The Motor Cycle* illustrations with some details have been given of the "post-war Matchless." I was very interested in the description, and it seems to me that this is, as far as I know, the first (perhaps there are other makers who have not yet announced their plans) British-made machine which can be considered to go one ahead of the Yankee article, and should command a large sale. It has many features about which a large number of home and Overseas readers have continually written to your paper, to mention, amongst other points, spring frame, efficient mudguards, 3in. tyres, powerful flat twin engine, mechanical lubrication, totally enclosed chain drive, enclosed valve springs, quickly detachable interchangeable wheels. I would like to make a remark on the machine, and that refers to the type of handle-bars, which appear to be very much like those shown in fig. 1, page 48 of your issue of January 18th, whereas, according to the article in question, it would be better if the handle-bars were of the semi-T.T. kind, as per fig. 2.

I would like to end by saying that I presume the difficulties mentioned in the article by Mr. Eric Williams, in the issue of the paper just mentioned, with reference to getting at the magneto, are overcome in the new Matchless.

London, S.W. A.M.I.E.E.

THE FLAT TWIN AT THE BAR.

Sir,—I have read Mr. Osborne de Lissa's further letter in your issue of January 25th very carefully, and still fail to find anything of practical interest, technically or otherwise, to motor cyclists. In fact, his whole endeavour appears to be a personal attack on the engine of my design, and principally on account of the progressive aims of the design. His statement that he likes to leave out technicalities, and that he has not found it necessary to impress technical knowledge upon everyone, confirms this. My impression is that one must either discuss technicalities or personalities, and I venture to suggest that the motor cyclist is interested enough in his hobby to prefer the technicalities. Mr. de Lissa thinks otherwise, therefore I may be wrong, but I am open to correction on this point.

Mr. de Lissa then proceeds to remark on the improved cooling, smoothness, lack of vibration, capacity for continuous heavy duty, and correct and regular oiling, which I stated were the aims of the A.B.C., but he still fails to explain technically or practically wherein these aims are wrong.

For instance, with regard to cooling he says: "From what I can gather the A.B.C. has nothing exceptional in this respect." All I can add is that he has gathered very little that is truthful, and personally I should be very diffident about making such remarks as he makes on mere hearsay, and without having a more intimate knowledge of my subject.

On the subject of vibration, he says that other horizontal twins with which he has had experience are equally vibrationless as the A.B.C. To this I can only add that either he has had no experience of the A.B.C. whatever, or else that he has not gone to the trouble of making a comparative test.

Personally I have made a very careful test of a modern M.A.G. engine, covering a distance of between four and five thousand miles, and in the light of such test I can only state that Mr. de Lissa is very gravely misinformed when he states that the M.A.G. engine will hold its own against any engine in the world in perfect smoothness.

Despite my assurances, Mr. de Lissa reiterates his suggestion that the A.B.C. engine causes burnt-up plugs, and this leaves me no alternative but to suggest that he produce a M.A.G. engine with any sparking plug he likes to name; we will run a duration test on identical plugs under identical conditions, and the results shall be published in *The Motor Cycle*. GRANVILLE E. BRADSHAW.

Sir,—I am afraid I cannot possibly keep out of the controversy between Mr. Bradshaw and Mr. de Lissa any longer. I am sorry to see Mr. de Lissa "snapping" as he is doing. I am equally sorry to see the letter of "A.M.I.E.E.," of Wimbledon Park. From it, it would appear that he is unable to discern "the pigeon in the flock of rooks." It would be equally sensible to say that, because Casement was a traitor all his countrymen are, too.

But to come to the question of flat *v.* V twins, I regret it has not been my pleasure to have a long fast run on an A.B.C., and so I must perforce confine my remarks to the Douglas. On several occasions it has been necessary for me to get from London to the North Wales district in a short time without much preparation. These journeys have been made on two types of machines—one, the flat twin, was a 2¾ h.p. Douglas, and the other a 3½ h.p. Motosacoche, which was fitted with Mr. de Lissa's patent air-cooled exhaust valve. My experiences showed me that it was impossible to let the flat Douglas all out for more than a mile,* and even then it took some time to recover itself, whereas the Motosacoche with the V M.A.G. twin, plus the air-cooled valve, could be let out full for as long as the road and rider would permit. (I do not wish it to be understood from these remarks that I took risks by "blinding" through villages, but I think most people know the long stretches of Watling Street dead straight and not a soul in sight.) From this I necessarily "plump" for the M.A.G. engine V twin for fast solo work. I have also had long runs with a sidecar both with a big flat twin and a big V twin, and for some reason the V twin seems to give far and away the better pull on a stiff hill after a twenty-mile run. I am not prejudiced in any way against the flat twin, and, in fact, I prefer it both for solo and sidecar work in town traffic, but when it comes to the open road I want a V twin every time.

S. Farnborough, Hants. LITTLE JOHN.

[*We would refer "Little John" to the results of the last Junior T.T.—ED.]

BEARING PRESSURES AND LENGTH OF STROKE.

Sir,—May I butt in *re* the article by "A.A.S." on bearing pressures?

He makes one very great error in *adding* the explosion pressure on the piston to the inertia force of the piston to arrive at the resultant pressure on the gudgeon pin at the moment of explosion. Obviously, the inertia force is upward and the explosion pressure downward, and the resultant pressure is the *difference* between these two forces and not

the sum of them. He also omits entirely the centrifugal force of the big end and lower part of the connecting rod in arriving at his big end pressures. This force, in addition to the inertia of the piston, has to be deducted from the explosion pressure to give the actual big end load.

I do not think that any of your contributors on the "Long *v.* Medium Stroke Engine" have gone deeply enough into the dynamic forces at work in a high-speed engine, and hence none of the arguments put forward are quite conclusive. The study of these forces entails some considerable work, but I hope shortly to complete an exhaustive analysis of all forces at work in two engines of similar capacities but different stroke-bore ratios. CHAS. K. EDWARDS.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—I think it grossly unfair that such a step as mentioned in *The Motor Cycle* for February 1st should be taken.

I suffer from slight deafness myself, but I do not find it interferes with my driving in the least, neither do I consider this affliction causes the least danger to the public. I always drive carefully and at moderate speeds.

Let the Northamptonshire Committee save the lives of the public by all means, but let it first find out the total number of accidents in the United Kingdom, say, for one year, and pick out those that are due to *deaf drivers*. I venture to say that most of the serious accidents are caused by "the road hogs," who continnally break the laws of the road, and who think that once their horn is sounded other motorists can go into the ditch before they will throttle down to anything like 30 m.p.h. Many a time I have been obliged to steer on to the grass at the side of the Great North Road in order to allow a car to dash between me and another vehicle. BERTHA A. ANDREAE.

Sir,—I entirely agree with the action of the Northamptonshire Licences Committee in urging that no licences should be granted to blind or deaf (or partly deaf) motor drivers. No sane man conld act otherwise, as it is obvious that on very many occasions the sonnd of a horn is the only thing that prevents a collision. If this is not so, why fit horns on motors at all?

However carefully a deaf driver drives there are many occasions on which he is bound to come to grief, if he cannot hear a warning note, whether a shout or blast of a horn. Again, what about runaway horses? A runaway on a winding road can he *heard* far away by a driver of average hearing capacity, and he can draw into the side of the road and thus avoid a smash. If deaf he will cheerfully keep in the middle of the road until he *sees* the runaway, when it will be too late. It is quite true that a reckless driver is *also* a source of danger, however good his eyesight or hearing may be. My experience of some five years on the road has shown me that a good 75% of motor cycle and car drivers should not be granted licences at all. Hardly a day passes without meeting some driver who drives full speed down a side turning into or across a main road, and often without ever troubling to sound his horn! In winding lanes, too, I am constantly meeting cars and cycles, the drivers of which never sound a horn, and, were it not that I always do so, there would be a smash every time. Whenever a driver cannot see more than, say, fifty yards ahead he should blow his horn, and failure to do so should render him liable to a stiff fine, £5 at least.

Our laws with regard to regulation of traffic are certainly a disgrace to a civilised nation. While we have absurd regulations with regard to dimming lights at night "in the interests of public safety," we bave no regulations against foot passengers walking in the centre of the road, or against the granting of licences to incapable drivers, both of which cause far more loss of life every year than could occur through a motor carrying the most powerful "searchlights."

No licence for driving a motor car or cycle should ever be granted without a preliminary test of eyesight, hearing, and "general intelligence." M. HITCHCOCK.

Sir,—I see in last week's number of your valuable paper that the Northamptonshire Licences Committee is making a representation to the Home Office urging that licences should not be granted to persons suffering from blindness, etc. May I ask what is meant by "blindness"?

I have lost my right eye and left leg as a result of wounds received in France, and some months ago bought a motor cycle and sidecar to enable me to get about better. I hope that there is no likelihood of people disabled as I am being refused licences, and, if there is, that *The Motor Cycle* will combat any such suggestion.

I have no foot controls on the left side, and as the sight of my one eye is very good, see no reason why I, or others like me, should be considered incompetent. M.C.S.

CAM DESIGN.

Sir,—*Apropos* of the article on cams, in your issue of February 1st, I should like to point out an error which "A.A.S." will, I think, agree that he has overlooked.

In his plan of construction for obtaining the contour of the cam, he has omitted to take into account the effect the curve of the roller has upon it.

In fig. 1 I give the correct construction, which shows a very different contour from that obtained by "A.A.S."—as shown in fig. 2, for comparison.

In these examples I have taken the case of harmonic motion, and have made every part of the same proportion as those given in his article.

The difference of the two constructions lies in the marking off of the actual points on the contour from those obtained by the intersection of the radii and the arcs. This should be done by drawing a succession of arms of radius

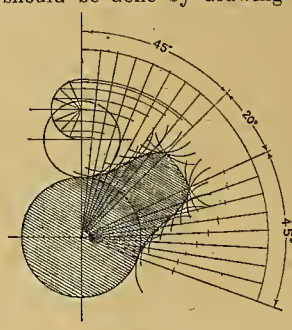


FIG. 1.
CORRECT CONSTRUCTION.

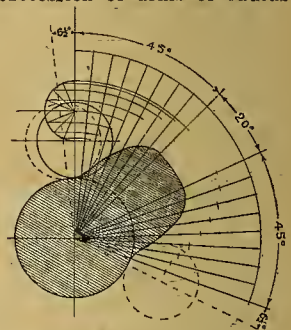


FIG. 2.
INCORRECT CONSTRUCTION.

equal to that of the roller, and with centres at the points of intersection just mentioned.

The true contour of the cam is then obtained by drawing a continuous curve tangential to these successions of arcs.

"A.A.S." has apparently merely stepped off distances on the radii equal to that of the radius of the roller. The curve of the contour obtained in this way would not impart harmonic motion to the valve. At the same time, it would cause the valve to remain open through a larger angle than he intends it to do. I have drawn in dotted lines (see fig. 2) the position of the roller—relative to the cam—when the valve would be on the point of opening and closing. In the example he has taken, it will be seen that the valve would open 6½° earlier and close 6½° later, giving a net opening of 123° instead of the intended 110°.

N.B.—The construction I have just shown is only strictly correct for rollers which are pivoted directly on to the tappet, *i.e.*, rollers which are confined to movement in a straight line radial to the centre of the cam (as taken by "A.A.S.") Rollers pivoted on to the end of a rocker would necessitate a more complicated construction.

E. R. GREEN.

HEATING THE INDUCTION PIPE.

Sir,—My twelfth and present mount is a 3½ h.p. overhead H.T.T. Brough, and as an experiment in tuning I "completely exhanst-jacketed the induction pipe."

For Capt. Lindsay's satisfaction I append the results, culled from a notebook my brother and I own, with all details of our machines, tunings, results, and expenses entered in it.

"Shoved a complete copper jacket on induction pipe of 'Mark I.' (my machine), led small copper tnbe from the front exhaust to the jacket, and sweated all joints.

"Mark I. now accelerates much qnicker than Mark II., and does at least twenty more miles to the gallon."

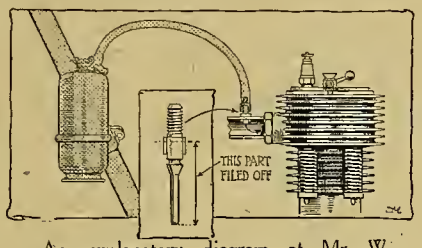
The second machine (my brother's) has now been fitted the same way, and doubtless, should I perpetrate the crime of taking leave soon, some new development will transpire.

JOHN HAWES.

STARTING ON ACETYLENE.

Sir,—I see in your issue of January 18th an article on "Starting on Acetylene." The idea is not new, as I used the same thing in the latter part of 1913, but gave it up as there is a great danger of the cylinder head being blown off through the explosion of the acetylene gas.

I bored a hole in the induction pipe and fitted an ordinary tyre valve. The sketch will explain how this was done. The bottom part of the valve was filed off, and the top part was pushed up through the induction pipe and secured by the dust cap (blind end filed off), which acted as a lock nut to hold the valve firmly in place.



An explanatory diagram of Mr. W McLean's device for starting on acetylene. (See letter.)

It was coupled to my P. and H. generator on the down tube by the foot pump connection. One end was screwed on the valve and the other screwed end was cut off so as to get the rubber to slip on the gas exit of the generator. I also fitted similar valves to two chums' motor cycles, and they, too, gave them a test, and have since discarded them. The fitting of the jet is a very simple job indeed, and need cost no one anything but the slight labour of boring. I note it is stated in a contemporary that the device is fully patented. It certainly starts an engine when using paraffin as a fuel, but give me petrol and I will leave acetylene gas alone. I never used it with paraffin, but I often did with naphtha as a fuel. The explosions were pretty violent, and would soon have played havoc with my 3½ h.p. Premier. My chums used it on a 1914 Humber and a 1915 Imperial-Jap. The heat, too, was considerable, more so than with petrol, and perhaps this is why paraffin gets vaporised so easily. It would be interesting to know the state of the bearings after prolonged use. I suffered a broken ball bearing on the timing side and a cracked piston. One has to be very careful with the spark lever, as a backfire with acetylene is a thing to be guarded against, especially when starting up.

Perhaps Mr. Passey will write and let us know what the engine bearings of the B.S.A. are like after 5,000 miles, and if he finds much deposit on his piston after, say, 1,000. I have tried all sorts of fuels—paraffin mixed with petrol, naphtha, benzole, acetylene and naphtha, and petrol substitute. Paraffin and petrol combined caused knocking on hills and a slight loss of power. Hot air pipes to the carburetter improved matters a great deal. Naphtha produced the same results, or nearly so. Benzole is the goods. When the war is over and the Government releases the benzole for public use I will use nothing else. This is the fuel of the future, I believe. Certainly my tank was destroyed by it, but I will have a special tank made for that fuel. Acetylene and naphtha give plenty of power, but considerable heat and knocking on hills if the spark be kept fully advanced. I discontinued its use because of breakages inside the engine and the danger of a burst cylinder owing to the violent explosion. Petrol substitute. Ugh! I must have got hold of a bad brand of it. "Na-poo." No matter what fuel you use, if you apply heat to the carburetter you will get far better results. With my 3½ h.p. Premier and heavy sidecar I could average 88 m.p.g. over the hilly roads of Fife after fitting hot air pipes to the carburetter. When on a week's tour last August the outfit was loaded up so heavily that my passenger (11½ stone) had to lie on the top of the sidecar with his feet over the front. I myself am nearly 12 stone, and the hills were a good length, which caused us to run for a considerable distance on low gear, and yet 88 m.p.g. was our average over seven days' running. The carburetter was a 1913 B. and B. single-jet model, jet No. 32. All the air was heated before entering the carburetter. My chum averaged 96 m.p.g. with a Humber. It had a B. and B. with a variable jet, and had also hot air pipes. His outfit carried a camp army bell tent and all utensils. So for economy and power *heat the carburetter*, no matter what fuel you use.

WILLIAM McLEAN.

INVENTIONS.

Sir,—I notice in last week's issue of *The Motor Cycle* a new Bowden wire nipple, and that it is the invention of one of Messrs. H. Taylor and Co.'s mechanics. With all due respect to the mechanic claiming to be the inventor, I wish to point out that the same idea was invented over forty years ago, and used on all the Willcox and Gibbs hand machine needle bars to secure the needle. If the mechanic in question has not seen one, he can do so at the firm's depot in London. No doubt he will be able to find out where there is one.

I, like a good many other mechanics, have invented things, but have never been able to bring them to the front. I might just mention that I made during my apprenticeship a brass spinning top that would spin for half an hour; I have one now in my possession that will spin for twenty-four minutes.

WM. BEECH.

PUSHING MOTOR CYCLES.

Sir,—As a medical practitioner of thirty years standing and a reader of your paper since 1904, I have been much interested in reading "The Hygiene of Motor Cycling."

I gave up pushing my own machine in 1910, when Messrs. Douglas Bros. fitted one of their first two-speed gears. I also gave up pedals at the same time.

Some of your readers may remember that I asked in your columns in 1906 that we medical practitioners who used our machines for professional purposes might be supplied with three improvements—

1. Multiple speeds.
2. Low-built machines.
3. Efficient mudguarding, with proper clearance between wheels and mudguards.

When these three are obtained there is no reason why, if the necessary spares are carried, any motor cycle should be pushed.

Since my letter of 1906 was written I have had over 100,000 miles of road experience by motor cycle, not one-tenth of which was over main roads, and much of it over downs and field tracks.

I have come to the conclusion that, in spite of the drawbacks of war time (such as no skilled labour and the impossibility of obtaining spares and necessary replacements), the motor cyclist who requires to push his machine is, as a rule, either not properly provided with spare parts, careless as to the condition of the machine, or not properly acquainted with the mechanism. He may, for his sins, be riding one of the very imperfect models which still somehow seem to survive in small numbers.

An interesting commentary on your articles appears in *The Referee* of January 28th, under "Aviation and Motoring." The writer points out that the Army is training motor cycle despatch riders to get them fit so that they could push their machines. How pitiful! And how likely to break down the really efficient brainy lightweight who, from his knowledge and resourcefulness, is invaluable for work which of necessity is a one-man job.

I know and have conversed with dozens of Army motor cyclists, many of whom I had met over competition work in the past, and have seen something of military motor cyclists' training, and can write from personal knowledge.

Motor cyclist expert knowledge seems to be lacking among the higher officers in any Army department where motor cycles are used, such as the R.F.C., A.S.C., Signals R.E., R.N.A.S., etc. Even the officer occupying the same position as the veterinary officer to a cavalry regiment, though excellent as a soldier and a gentleman, has little or no practical knowledge of the machines.

As regards non-commissioned officers, many are experts, but are these to obey orders issued by gentlemen who know little or nothing about the mechanism with which they are working?

If the men with a thorough knowledge of motor cycles now scattered hither and thither throughout the Imperial Forces were put in command of motor cycle units and in supervision of factories at home we would rapidly find the right machines going to the Front, the right men riding them, the right men being trained at home to take their places, and thus training would be conducted in the quickest and most efficient manner.

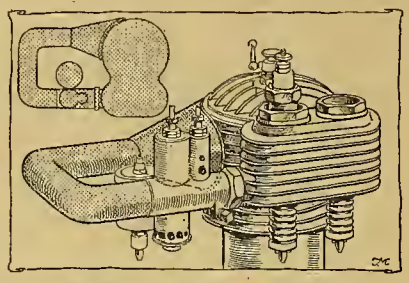
May we get efficiency before it is too late.

CHARLES S. PATTERSON, M.B., M.R.C.S.,
Late Judge Auto Cycle Union.

HEATING THE CARBURETTER.

Sir,—I was interested in H. H. Brownrigg's letter in *The Motor Cycle* of January 18th. It has frequently been stated that a hot air intake makes for better running and petrol economy. With this in view, I fitted on to my 3½ h.p. Sunbeam a Binks carburetter having a hot air intake, but with the addition of a wide bell mouth.

I tested it last November, when the weather was fairly warm. I ran without the hot air intake twenty miles by the speedometer at 25 m.p.h., and used one and three-fifth pints of Shell No. 2, carefully measured. I waited three hours, attached the hot air intake, and did the same run at the same speed, with the same result, *i.e.*, 100 m.p.g.



Another device for heating the carburetter. (See letter from M.A., LL.B., M.B.)

I have noticed that the whole of the hot air intake gets quite warm right round to and including the carburetter within a few miles of starting. Further, I found the engine knocked more than it had previously. In the recent cold weather the hot air intake does not get so warm, and the knocking is less.

I have not had time for further experiment, and would like to hear from anyone who has actually tried whether a hot air intake does economise petrol. It is necessary for paraffin. M.A., LL.B., M.B.

Bury St. Edmunds.

SINGLE V. TWIN-CYLINDER ENGINES.

Sir,—I always read with great interest your paper, which has already done so much good for the motor cycling cause, and notice in *The Motor Cycle* of February 1st a letter from Mr. S. Barker, in which he praises up his American motor cycle. He states that our British makers "will stick in a groove," and talks about the refinements and wonderful reliability of his machine. We all know that the Harley-Davidson is a good machine, but I venture to think that English makers holding a similar position in this country are able to make machines with certainly equal if not greater reliability and refinements than the Harley-Davidson. I wonder if Mr. Barker has ever tried a Sunbeam, an A.J.S., or a Zenith. If he has tried any of these and still prefers the American machine, all I can say is there is no accounting for tastes. If he has not tried any of them, then I do not think he has any right to criticise English manufacturers as a whole. Personally, I prefer to buy English to American goods provided one gets value for the money.

The usual disclaimers. C.A.L.

Hengrave.

Sir,—I know little of motor cycles, but ignorance is nowadays no excuse for silence. I may, however, claim to be interested in every way except financially, and I wish to shout with the crowd of those who prophesy the early decease of the single-cylinder.

For two months last summer I did a great deal of motoring on a 3½ h.p. and sidecar, having one cylinder and a much quoted name for excellence. It was simple, reliable, cheap to run, and reasonably fast, on the level at least. But the vibration was horrible, and neither specialist engineers nor my own experience with cars could induce it to run slowly when not under load. These faults were so glaring that they quite outweighed any merits.

This will surely not do. Cars have long outgrown such monstrous defects, and such a jerky type of engine. They will never return to it; machinery is not atavistic. Why should it survive on motor cycles? May its time, for the sake of all suffering riders, be short.

Most of the apologies for the single-cylinder that I have read reduce themselves to one plea—simplicity. Now simplicity is not a virtue in itself and by itself in engineering any more than in other things. If complication gives better service, simplicity must go. So it has been with cars, where the same arguments served as funeral orations for what they were defending; so it will be with motor cycles, if it is not so already. All cars nowadays have four cylinders (save those which have six or eight), even in the smallest size and power. Though four may be too many for a motor cycle, owing to restrictions of space—from all accounts the flat twin is an excellent substitute—one cylinder is most certainly too few.

The single-cylinder has shown the way, but, partly for that very reason, it cannot follow it further. To pioneers all credit is due; but when the land is settled and cultivated, none but the sentimentalists regret the conditions of the pioneers. M.E.I.

The Hague.

Sir,—In *The Motor Cycle* dated January 18th, 1917, "Ixion" expresses his surprise that no rider of the big twin has written upholding the merits of this particular kind of mount.

At the present moment I am the possessor of an 8 h.p. single-speed overhead valve Matchless-Jap. I find it an exceedingly pleasant mount to ride, and not a vibrating monster, as so many enthusiastic riders of flat twins would have us believe. It is exceptionally easy to start, three or four yards at a sharp walking pace never failing to start it even from cold.

One of the objections raised against big twins is their great weight. My Matchless is very light, somewhere in the region of 200 lb.; perhaps this is on account of the absence of a gear box. I presume it is unnecessary for me to dwell on the speed and power of such a mount.

I am of the opinion that such a machine fitted with a variable pulley, such as the Philipson, would be a very pleasant touring mount.

R. C. M. KERMODE.

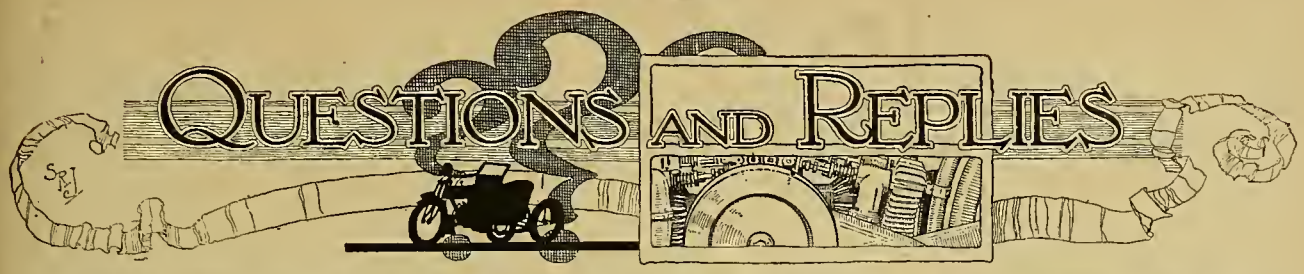
Sir,—Allow me to thank your correspondent "H.K.P." for his exceptionally pleasant remarks regarding the efforts I have made in my numerous letters and contributions to your journal to help your readers.

I am also very interested to read Capt. A. Lindsay's further letter, and now quite agree that we are not at variance on the subject of induction pipe design. I am quite willing to admit that the single-cylinder vertical engine is a much easier proposition from the induction pipe point of view, and that, in order to obtain the numerous advantages of having a flat twin engine, the designer must pay much closer attention to the induction pipe on such an engine; but this, in any case, is not really a difficult matter.

With regard to Capt. Lindsay's paragraph, "Can an engine be said to be uniformly cooled when two such dissimilar temperatures can exist 6in. apart in a mass of metal under running conditions?" I am sorry I misconstrued his contention in the first rendering of the same paragraph, which is, as a matter of fact, the crux of the whole problem in air-cooled cylinder design. It is physically impossible in engine design as we know it to-day to maintain an even temperature in the whole mass of metal comprising the cylinder and its adjacent parts. The inlet is cool and the exhaust is very hot. It does not affect the inlet port if the carburetter is placed further away and becomes excessively cold, and the question of carburetter heating and long induction pipe is a totally different one from that of uneven temperatures in the cylinder itself. What *does* matter is the effect this difference in temperature in the cylinder may have upon the rotundity of the bore and the temperature of that part in contact with the pistons, and the principal thing left to the designer is to arrange these in such a manner that they are least detrimental to the life and efficiency of the working parts of the engine. The arrangement I have adopted is to place the exhaust valve overhead, and to insulate this against close contact with the cylinder walls by interposing the cool induction passage, and I have found that very little experiment is required in order to balance up the heating almost exactly.

With regard to Capt. Lindsay's suggestion of completely exhaust-jacketing the induction pipe of a flat twin engine, there is no reason at all why this should not be done, and an induction pipe of such design was used by Emerson on the track. A little care has to be exercised in the construction of such a pipe in order to prevent it cracking through the exhaust jacket being very hot and expanding to a greater extent than the cooler induction pipe.

GRANVILLE E. BRADSHAW.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C., and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Naphthalene Balls in Fuel.

May I ask your advice with regard to the use of naphthalene balls in motor fuel? Are they likely to have an injurious effect upon the engine, and are they likely to give any increase in mileage per gallon?—L.G.M.

We do not think that naphthalene balls can possibly have any injurious effect upon a motor cycle engine. Some of our readers claim to have found that they give a marked improvement both as regards running and in the matter of carbon deposit. A Faraday House test has shown that the extra mileage is not likely to be more than 0.5%, and where any large increase is discovered it is probable that other circumstances have affected the result to some extent.

Clutch will not Disengage.

The clutch of my Sturmey-Archer three-speed hub is so tight that no adjustment which I can make will render the engine free enough for me to start it with the wheels on the ground. I always find it necessary to put the machine on the stand to start the engine. The operating rod did not appear to be long enough, for when it was pushed in so that its end was flush with the end of the axle the engine was not free, so I fitted a slightly longer rod and adjusted the operating screw. This gave some freedom, but it is still impossible to start the engine with the back wheel on the road. Can I remedy this by removing one or more of the clutch plates? I had new plates fitted some months ago, and it is only since then that this trouble has occurred. If removing the plates will cure the trouble, please tell me how this must be done.—E.McC.

Although removing one of the plates may free the clutch, we do not think this should be necessary. According to the detailed instructions for fitting and adjusting a Sturmey-Archer three-speed hub gear, published by Sturmey-Archer Gears, Ltd., failure to release the clutch is due to too slack an adjustment of the clutch rod and bad operating position of the clutch worm arm. The clutch worm may project too far over the axle end, or the clutch pedal tube may not be held securely from revolving. It is quite possible that the stiffness is due to the oil used for lubrication being too thick. Try washing the clutch out with paraffin and oiling with thin oil. You may have been using a wrong grade of oil, which has lost its lubricating qualities and merely gummed up the plates.

Motor Cycle Speed.

As a result of discussion with a fellow D.R. I am writing to ask if you will kindly supply me with details of the world's record speed attained by motor cycle?—F.P.J.

In England the highest speed officially attained by a motor cycle is nearly 93 m.p.h., by Sidney George, on an eight valve 7 h.p. Indian on Brooklands. In America and Australia speeds exceeding 100 m.p.h. are claimed to have been made, the highest being by Jack Booth, who in Australia, on the Gawler Road, covered a mile in 35s., which equals a speed of just under 103 miles per hour. His mount was also an eight valve 7 h.p. Indian.

Decarbonising.

I have been running my 4½ h.p. B.S.A. combination on paraffin after having fitted a hot air intake, an exhaust jacketed induction pipe, and after taking the fuel feed pipe once round the cylinder head, and have found these arrangements perfectly satisfactory until the engine becomes carbonised, when knocking begins. This takes place after about 500 miles or so, and is put right only by decarbonising in the ordinary way. I note that a chemical decarboniser exists for mixing with the lubricant to keep the engine free from deposit, and shall be glad if you can tell me (1) Whether it would be suitable for my purpose, and would prevent my having to take the engine down every 500 miles? (2.) Can it do any harm to the engine?—A.M.I.E.E.

(1.) We do not think that such a preparation would have very much effect. (2.) The only satisfactory way of avoiding taking down the engine every four or five hundred miles is to get it decarbonised by the oxygen process. The knocking you complain of might be considerably reduced if the compression were reduced slightly.

DELAYS IN POSTAL DELIVERIES.

In view of depleted staffs, the curtailment of railway services, and the consequent delay in delivery of mails, readers will greatly assist by forwarding communications (including advertisements) as much as possible in advance of the dates of the issues for which they are intended.

Reducing Tyre Troubles.

Since I cannot carry a spare wheel, what is the best method of ensuring freedom from puncture in the driving wheel? I often have to ride at night and in the wet, and therefore wish to take every precaution to avoid tyre trouble. Is it advisable to have tyres retreaded as soon as the pattern has worn down? Does a retreaded tyre behave as well as a new tyre in resisting puncture?—E.E.

The only way is to use as heavy a tyre as you can, or to fit an inside liner, obtainable from the principal accessory dealers. Nail catchers made of stout wire, or a piece of metal bent to the contour of the tyre tread and fixed to some part of the machine so that the tyre runs as closely as possible to it, may help to prevent punctures due to nails. It is not advisable to have tyres retreaded unless the retreads are intended to be used on the front wheel or sidecar wheel. A retreaded tyre may behave as a new one in resisting punctures, but it also may burst owing to an unnoticed weakness in the walls or tread.

Two-stroke Rattle.

I have a 2½ h.p. two-stroke which I carry to sea with me. Recently it has developed a rattling noise, similar to that of drawing a stick rapidly along a corrugated iron hoarding. This noise is only perceptible when I lift the compression release valve. I have the engine taken down at the moment of writing, but I do not see any signs of a slack bearing; there is just a little side play in both the crank and main bearings, but I take it this is quite usual.—Lt., R.N.R.

The rattling noise you complain of is a very common trouble with small two-strokes, and is one of those problems which has never been really satisfactorily solved, one rider claiming to have cured it one way, while another gives a totally different treatment. We would advise you to look at all the following points: Remove all carbon deposit very carefully from both cylinder and piston, also from behind the piston rings. Make sure there is no up and down play in any of the bearings; side play does not matter. Use a good plug with stout electrodes which will not become incandescent and cause pre-ignition. See that the exhaust outlet is perfectly free. You will probably find that after a careful clean out the noise will cease—at any rate for a time.

Lady's Motor Cycle.

[?] Will you please give me advice on the following points with regard to buying a motor cycle for use by a lady who is an expert cyclist, but has never before ridden a motor cycle? Would you recommend: (1.) A second-hand machine to begin with or a new one? (2.) A gentleman's model or one specially built for a lady?—F.R.

(1.) It is always preferable to buy a new machine if possible, as second-hand machines usually have had the best running taken out of them. A couple of trial runs on a second-hand should suffice to prevent ill usage of the new mount. (2.) Whether a lady's or gentleman's model is chosen is entirely a matter of personal taste. A lady's model is probably more convenient, as the rider would not be quite so restricted as to the choice of dress.

Valve Timing.

[?] I should be greatly obliged if you would let me know in as plain words as possible how I could time the valves of my 3½ h.p. single; also the ignition timing.—D.F.

You will find the following valve timing quite satisfactory for all-round touring: Exhaust valve closes when the piston reaches dead top of stroke, inlet opens immediately after; leave the opening of exhaust and closing of inlet to the design of the cams. If the inlet and exhaust cams are both mounted on the same gear, time the exhaust valve as directed above; the other settings will then be automatically correct. The spark should be timed to occur as early as possible without causing knocking; try setting it as follows, and if not right it can be moved in either direction as the running indicates to be necessary: Piston top of stroke (that is, one complete revolution after exhaust has closed), contact breaker half advanced, contact points just about to break.

Whose Fault was it?

[?] Would you kindly let me know who was in the wrong in the case of an accident which I am about to describe. I had just started my motor cycle and had got about 100 yards up a hill, and was on the left-hand side of the road, when I saw a coal cart on the extreme right-hand side. I did not sound my horn, but my engine was making plenty of noise, and as it was impossible for even a pedal cycle to get round on the right-hand side, I tried to go by on the extreme left. Then the man driving the coal cart, without holding his hand out or making any sign whatever, turned his horse round in the road right into me. Had I gone on I should have struck the horse. I tried to turn, but it being too sharp an angle and too greasy a road I went over. Then the driver finished turning round and went off shouting out something about it being my fault. I broke six spokes in the back wheel, bent the mudguards, broke a pedal and bent a crank, but did not hurt myself, so I was fortunate. I was travelling at about ten miles an hour.—K.M.S.

You were clearly in the wrong. In nine cases out of ten you might have got through safely, but this does not exonerate you. If the matter were brought up before any court the magistrate would say that if you were in doubt you should have stopped and waited. You were also in the wrong in not giving warning of your approach. The noise of your engine does not count as "audible and sufficient warning," and if it makes too much noise in the opinion of a police constable you may be prosecuted. The driver of the cart should, of course, have indicated that he was about to turn, but he was not under any legal obligation to do so, while the law says the driver of a motor car or motor cycle must give warning of his approach.

READERS' REPLIES.

Misfiring.

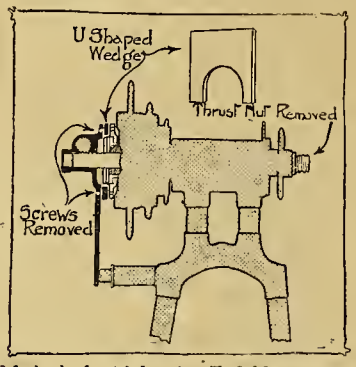
Re your reply to "T.B." concerning faulty firing with Ruthardt magneto, the regularity of the misfiring points to the defect being caused by a flat having formed on the fibre roller. The C.A.V. people will supply a new roller, as their sizes are the same.—I. COHEN.

Intermittent Misfire.

With reference to "F.W.R.'s" question in your issue of January 25th, I had the same trouble with a Ruthardt magneto. I found a small flat worn on the fibre roller, and at another time the spring blade was rubbing against the face of the contact breaker. I obtained another roller from Messrs. C.A.V., of Acton, and put a very small quantity of graphite on it to save the roller from sticking. I have not had a misfire since.—J.E.

Slip in an Enfield Gear.

I had the same trouble as "E.A.F.," and I wrote the Enfield Co. about it. They have always been very kind in replying to any query I have sent, but I still failed to get out the spindle of my two-speed gear. However, after thinking it over the method dawned on me early one morning in bed. I proceed as follows: (1.) Draw gear handle back into low gear position. (2.) Remove handle from gear rack and hexagon nut on end of thrust bracket. (3.) Take out four or six (six in older pattern, four now, I note) screws in thrust bracket and nut on thrust arm bracket. (4.) With spanner instead of gear lever on rack, turn the rack as far as it will go, *i.e.*, into lower gear position if that were possible. (5.) Insert piece of wood or spanner behind the thrust bracket. Pull rack up and turn it back so as to get a new grip of pinion on sliding cam. (6.) Turn spanner on rack and cam will come out. The whole secret is in putting a U-shaped piece over the sliding cam to take up the distance through which the rack turns.—W.G.H.



Method of withdrawing Enfield gear cam.

Starting a Single-geared Lightweight.

I notice your corespondent "W.B." states he has trouble starting his 2¾ h.p. two-stroke. I have a 2¼ h.p. Levis, and at one time had difficulty in starting on cold mornings. Now I take out the plug, a three-point Lodge porcelain insulated, fill it with petrol, by using the pet cock at the petrol lever, insert the plug again, and paddle off. I also flood the carburetter. I have never known this to fail, even when there has been a quantity of oil lying in the crank case, which splashes up into the top of the cylinder with the gas, and often fouls the plug if not primed. For easy detaching of the cable from the plug I have an open-ended brass connection. I do a good deal of riding in the dark, and a hint in your paper some time ago on how to fit a tell-tale bulb to a rear lamp has relieved me of great anxiety since I adopted it. The police are very keen on rear lights.—J. FAIRLAM HORN.

In your issue of the 25th ult., on page 84, there is a reply to "W.B.," who is experiencing trouble in starting his lightweight. I note that he has a Dixie magneto, and with this fitted the ordinary plug and platinum point gaps are quite useless. I venture to suggest that the cause of his difficult starting is that the gap at the plug points is much too wide. The Dixie magneto gives a diminutive spark, and the plug points should be set very close together, one-sixty-fourth of an inch being sufficient. With reference to the gap at the platinum points, .4 mm. is again much too wide; the makers themselves recommend a gap of from ten to twelve thousandths of an inch, but from my experience of a considerable number of these magnetos the platinum points must be set as close as possible. If "W.B." will set his plug points as close as possible, and the platinum points to the thickness of a piece of stiff brown paper, I think his starting troubles will cease.—W. STANLEY BANNER.

RECOMMENDED ROUTES.

HINCKLEY TO CHELMSFORD.—H.A.

Hinckley, Crick, West Haddon, Northampton, Bedford, Shefford, Hitchin, Stevenage, Ware, Harlow, Ongar, Chelmsford. Approximately 115 miles.

WREXHAM TO AVONMOUTH.—W.A.W.

Wrexham, Ellesmere, Burlton, Shrewsbury, Cressage, Much Wenlock, Kidderminster, Worcester, Tewkesbury, Gloucester, Alveston, Almondsbury, Henbury, Avonmouth. Approximately 140 miles.

DOVER TO WOLVERHAMPTON.—C.R.S.

Dover, Canterbury, Sittingbourne, Chatham, Rochester, Gravesend, by ferry to Tilbury, Orsett, Brentwood, Ongar, Harlow, Hertford, Hatfield, St. Albans, Berkhampsted, Tring, Aylesbury, Bicester, Banbury, Sunrising Hill, Stratford-on-Avon, Alcester, Headless Cross, Bromsgrove, Stourbridge, Kingswinford, Wolverhampton. Approximately 230 miles.

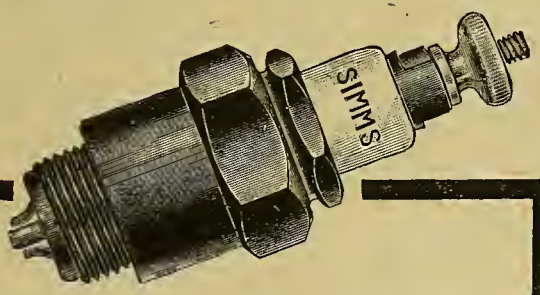
Bowden Wire Ltd: London

BOWDEN Wire, Limited, being wholly engaged upon production for the British and Allied Governments, are unable to execute any orders for private purposes until further notice. They have in stock certain goods suitable for replacements. Customers are invited to state their requirements in this respect, and, if possible, these will be met.

Victoria Rd. Willesden Junction. N.W.

Godbolds

SIMMS NON-SOOT PLUG



With the Simms "Non-Soot" Plug, every care is taken to see that the gaps between the contacts are set correctly, and as a consequence, this plug does not short circuit, and can be relied upon to fire perfectly at all engine speeds. This plug, like the Simms Magneto, is of British manufacture throughout.

Price. Metric or American Threads, Single or Twin Contacts,

3/6 each.

ALL DEALERS AND

SIMMS MOTOR UNITS, LTD.,

PERCY BUILDINGS, GRESSE STREET,

RATHBONE PLACE, LONDON, W.

I SUBMIT there

is a solid reason why you should adopt a

BINKS CARBURETTER, viz.:

YOU CUT YOUR FUEL BILL IN TWO

if you adopt my system and use my fuel. You can, of course, use petrol or benzol without alteration.

Price of Carburetter complete—

49/-

plus 10% extra war cost.

FIT ANY MACHINE.

Small extra Tank to clip on Frame,

17/6

Pipe & 3-way Tap to enable you to get an easy start when stone cold,

12/6

plus 10% war advance.

READ!

MY 3-PHASE JET DAMPING CARBURETTERS

have such perfect vaporising properties that they enable you to use fuel at **1/10** per gallon in 42-gallon casks, which you are allowed to keep on your premises. Casks **12/6** each, returnable at **10/-** each. Your engine will tick over dead slow, and pull dead slow in traffic, yet give the full power. It is almost impossible to tell you are not running on petrol at **3/-** a gallon. It cannot damage your engine or soot it up, and makes Motor Cycling possible in these times.

I give you my personal assurance of the truth of what is stated above. Please send at once for full particulars of the carburetter, and also for my Treatise on Carburation, and terms of One Month's Approval Trial.

C. BINKS, Ltd., Eccles.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle" Coventry, or London (20, Tudor St., E.C.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed, "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged, when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.B.C.

A.B.C., 3½h.p., the 1914 T.T. machine ridden by Emmerson, exceptionally fast, bought in 1916 from A.B.C. Co., fitted with brand new overhead valve engine, overhauled, enamelled, and plated, 3-speed countershaft gear, 60 m.p.h. on middle, lamps, 80 m.p.h. speedometer, and all accessories, with lightweight Henderson 10 gn. sidecar, not used 200 miles; £70.—Kitchin, 71, Ashland Rd., Sheffield. [X5875

Abingdon.

1915 5-6h.p. Abingdon, 3-speed, lamps, etc., coach-built sidecar, hood, screen; numerous spares; a good lot, and cheap; £55. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill [7692

A.J.S.

A.J.S., 4h.p., immediately, for cash.—Hassal, Prees Heath, Salop. [8212

A.J.S., 4h.p., 1917, with sidecar and screen; £95/7.—Dan Guy, Weymouth. [8002

A.J.S 4h.p. Combination, direct from makers.—W Brandish, Charles Garage, Foleshill Rd., Coventry. [X5986

A.J.S., 1915. 2¾h.p., 3-speed, clutch, lamps, tools, and accessories; £38.—C. Empson, Gamlingay, Sandy, Beds. [X5923

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10863.	2¾	1915	2-sp. **GRANDEX PRECISION**	£30 0
10865.	3½	1912	F.E. **SINGER** and S/car.	£25 0
10866.	1	1914	**WALL AUTO-WHEEL**	£10 0
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10840.	2½	1915	2-sp., 2-str **CALTHORPE**	£30 0
10846.	3½	1912	2-sp. **ARIEL**	£18 10
10847.	3½	1915	2-sp. **NORTON**	£55 0
10850.	1	1915	single-speed **J.E.S.**	£15 0
10852.	5-6	1913	2-sp. **A.C.** Sociable	£37 10
10856.	9-4	1915	3-sp. **SAXON** Light Car	£120 0
10858	3½	1910	single-speed **HUMBER**	£12 0
10860.	2¾	1913	2-sp. **DOUGLAS** & S/car	£30 0
10861	3½	1915	3-sp. **JAMES**	£52 10
10862.	4½	1915	3-sp. **QUADRANT** & S/c.	£45 0
10869.	3½	1916	3-sp. **SUNBEAM** & S/car.	£85 0
10824.	3½	1913	3-speed **TRIUMPH**	£37 10
10831.	5-6	1915	2-sp. **FAFNIR** and Sidecar	£32 10
10786.	2¾	1911	Single-speed **HOBART**	£20 0
10789.	8	1914	**HUMBERETTE**	£75 0
10794.	4-5	1914	**ZENITH** Gradua	£42 10
10795.	3	1914	2-sp. **ROYAL ENFIELD**	£42 10
10802	4¼	1915	3-speed **B.S.A.** chain-cum-belt	£52 10
10804.	3½	1913	3-speed **TRIUMPH**	£37 10
10805.	4	1911	3-speed **BRADBURY** and wicker Sidecar	£32 10
10806.	3½	1912	3-speed **TRIUMPH**	£30 0
10808.	3¾	1915	2-sp. **SCOTT** and Sidecar	£63 0
10768.	3½	1910	single-speed **TRIUMPH**	£20 0
10772.	4	1915	3-sp. **DOUGLAS** and Sc.	£65 0
10776.	3½	1911	single-sp. **LINCOLN-ELK** and Sidecar	£20 0
10744.	2¼	1915	2-sp. **ALLON**	£27 10
10748.	2¼		single-speed **HOBART**	£20 0
10751.	8	1915	**MORGAN** Runabout, De Luxe Model	£94 10
10705.	12-16		**VAUXHALL** Car	£125 0
10713.	4-5	1914	**ZENITH-GRADUA**	£37 10
10717.	4½		**PRECISION**	£22 10
10724.	3½	1912	3-sp. **TRIUMPH** and Sc.	£42 10
10682.	3½	1914	3-sp. **BRADBURY**	£47 10
10687.	1½		single-speed **J.E.S**	£10 0
10688.	2⅜	1911	2-sp. **DOUGLAS**	£22 10
10699.	3	1913	3-sp. **HOBART** & Sidecar	£35 0
10701.	2¾	1911	single-speed **DOUGLAS**	£22 10
10638.	3½	1912	single-speed **INDIAN**	£20 0
10643.	3½	1914	**RUDGE** Multi	£40 0
10649.	3½	1913	single-speed **B.S.A.**	£25 0
10661.	6	1913	**ENFIELD** and Sidecar.	£45 0
10673.	4½	1914	3-sp. **B.S.A.** and Sidecar	£45 0

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A.J.S.

A.J.S. 1914¾ 6h.p. Combination, hood, screen; 60 gns.—29, St. Leonards St., Bow. [8108

RIDER TROWARD'S, 78, High St., Hampstead.—1914-15 A.J.S., 2¾h.p., 3-speed, clutch, kick start; 38 gns. [8248

A.J.S., 2¾h.p., 2 speeds, chain driven, in real good order; £22.—Percy and Co., 337, Euston Rd., London. [8178

A.J.S., late 1915, 4h.p, in perfect condition, mileage 2,000, Watford speedometer, Lucas lamp; any examination allowed; lowest £58—Hudson, 10, High-cross St, Leicester [X5926

1915 4h.p. A.J.S. Combination, all detachable wheels, spare wheel, speedometer, lamps, horn, and all spares, not done 2,000 miles; £85.—Wilkin and Co., Hunters Bar, Sheffield. [X5934

LATE 1913 6h.p. A.J.S. and sidecar, engine as new, just overhauled by makers at a cost of £9, 3-speed, kick start, lamps, horn, spares, newly enamelled; £45.—J. W. Lee, East View, Bradwell, Derbyshire. [X5831

6h.p. Twin A.J.S. and Sidecar, latest model, sloping top tube from head to saddle-pillar, Lucas lamps, Klaxon hooter, sidecar lamp, Watford speedometer, 3-speed, free engine, h.b.c., kick starter, chain drive transmission, countershaft gear, fitted with handsome De Luxe coachbuilt sidecar, including hood and screen, beautifully upholstered, detachable wheels, spare wheel and tyre complete; the combination in the very pink of good condition; price 90 gns., guaranteed.—Wauchope's, 9, Shoe Lane, Fleet St., London. [8119

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

ALLDAYS Allon, November, 1915, model de luxe, just rebushed, perfect; £35, offers.—Wynn, Haven, Woodley, Reading., [8139

ALLDAYS Allon, 1915 model, used about 2,000 miles, condition as new; £30.—Apply, Massey and Rossiter, Ripley, Surrey. [X4943

ALLDAYS Allon, 1916, 2 speeds, clutch model, with 11 gn. C.B. L.W. sidecar; £45.—Croney, 43, Dorchester St, New North Rd., N. [7882

ALLON.—All 1917 models in stock, 36-45 gns.; exchanges and deferred payments arranged.—Maudes', 100 and 136 Gt. Portland St., London, W. Tel.: 552 Mayfair. [7387

Ariel.

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

3h.p. Ariel, 26×2, Druids, want retiming; sacrifice, £6/10, offers; will separate. — Micklebugh, Thames Ditton. [X5979

RIDER TROWARD'S, 78, High St., Hampstead.—Ariel, 1913, variable gear, re-enamelled, overhauled; 19 gns [8241

ARIEL, the reliable motor cycle, 3½h.p. single, and 5-6h.p. twin models; delivery from stock.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0889

NOVEMBER (1914) 5-6h.p. Ariel Coachbuilt Combination, 3-speed countershaft, kick starter, new Pedley back, wind screen, all spares; any trial; £48, no offers.—Hollinghurst, Japour, Portmore Park, Weybridge. [8207

I CAN Give Immediate Delivery of 1917 5-6h.p. Ariels, 3½h.p. Ariels, solo or combinations; exchanges or deferred payments. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7699

Arno.

1915¾ Arno, 3½h.p., absolutely as new, fully equipped; £25.—20, Whitley St., Reading. [8209

ARNO, 2½h.p., Bosch, Druids, stand, carrier, and Grade gear, in first-class order and condition; £20.—Maxim, 31, Hainthorpe Rd., West Norwood. [0894

Auto-Wheels.

SEVERAL Late Model Auto-Wheels, in splendid condition, from £7 to £10 each—Murray's, 37a, Charles St., Hatton Garden, Holborn. [X5925

AUTO-WHEEL, B.S.A. Model de Luxe, Hammond shock absorber fitted, little used; £10/10.—Chesworth, 206, Hungerford Rd., Crewe. [X5931

AUTO-WHEEL, B.S.A. model, 12 gns.; deferred terms if required.—Lamb's, 151, High St., Walthamstow, also at 50, High Rd., Wood Green. [8043

WALL Model de Luxe Auto, late 1915, splendid condition, little used, and B.S.A. built bike; £13, or nearest cash.—Pearson, 36, Maple Rd., Luton, Beds. [7999

Bat.

BATS.—P. J. Evans, John Bright St., Birmingham, Midland agent. Delivery from stock 4-5h.p. sporting model. [8193

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Bat.

SPECIAL Brooklands 1912 6h.p. Bat, m.o.v., 4th 70 m.p.h. long handicap, do 75; £25.—Wallace, L. Company, R.M.C., Camberley. [8007

BAT-J.A.P., 1914, 5-6h.p., coach combination, 3-speed, all accessories, perfect order; cheap.—Blaker, Glebe Villa, Portslade. 'Phone: 42. [X5832

Bradbury.

BRADBURY, 3½h.p., 1915, 2-speed, and Millford sidecar, overhauled; £35; extended payments arranged.—Service Co., 292, High Holborn, London. [X5895

BRADBURY, 1914, 4h.p., 2-speed gear box, hand clutch, and Bradbury coachbuilt sidecar, lamps, and horn, just been overhauled; £50.—Cadet S. Rhodes, Trinity College, Oxford. [X5649

Brough.

BROUGH. 5-6h.p., 3 speeds, and sidecar; what offers over £38.—65a, Rosendale Rd., West Dulwich. [8056

B.S.A.

B.S.A., 1917 models H and K, with sidecars, in stock. —Moss, Wem. [X5964

COLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

1915 B.S.A. Model K, splendid order; best cash offer. —Stobbs, Grocers, Woisingham, Co. Durham. [X5881

1916 B.S.A., model K, new July 26th, perfect condition; £51.—Heather, 219, Albany Rd., Coventry. [X5985

B.S.A., 3½h.p., 1913, free engine, in real good order and condition; £21.—Percy and Co., 337, Euston Rd., London. [8174

B.S.A., 1913, 2-speed, Canoelet sidecar, lamps, horn, etc., splendid order; £35.—Sinclair, 252, Bonnington Rd., Leith. [X5975

B.S.A., 1916, all chain, overhauled, all accessories; £55; extended payments arranged.—Service Co., 292, High Holborn, London. [X5894

B.S.A., 1914, 3½h.p., 2-speed, F.E., speedometer, lamps, etc.; £30.—Cocks, Durham Motor Works, opp. South Ealing Station. [8088

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert J. Pitts, Redditch. Tel.: 91. [X0529

B.S.A., 1915, 4¼h.p., 3-speed, Canoelet sidecar, De Luxe model, wind screen, latest draughtproof; £58.—Easting, 59, Abbey Rd., Bearwood, Birmingham. [X5933

B.S.A., 1916, 4¼h.p., chain drive, Canoelet combination, hood, wind screen, Lucas lamps, 3 speeds, kick start, perfect; £60.—Stratton, 31, Mount Pleasant, Redditch. [8010

1916 (November) Model K B.S.A., in perfect order, 3-speed, lamp set, mechanical horn, mileage under 200; illness reason for selling; £58.—Bruce, 265, Spring Bank West, Hull. [8019

B.S.A., 1915, 4¼h.p., chain-cum-belt, 3-speed, with Mills-Fulford sidecar, coachbuilt, accessories; sacrifice £54, or exchange for Ford 5-seater.—Capt. Fish, Gas School, Bulford. [X5921

1913½ B.S.A., chain drive, 2-speed, clutch, kick start, Lucas lamp, recently overhauled and perfect, smart torpedo sidecar; £33, no offers.—P., Whitecotte, Petersham Av., Byfleet, Surrey. [8029

B.S.A., 1916 model, chain-cum-belt, spring seat-pillar, mechanical horn, spare tank, tube, watch, spares, etc., guaranteed perfect condition; £52.—Capt. B., Harvey House, South Farnborough. [8064

B.S.A., 1916 (June), all chain, Rudge C.B. sidecar, hood, screen, lamps, horn, and numerous spares, mileage under 1,000, only used week-ends; £66.—8, Springville Av., Moston, Manchester. [X5817

1917 B.S.A.'s, models H and K absolutely in stock; also 1914 4 months' old model K, with No. 1 B.S.A. sidecar, all lamps, etc., a rare bargain, £67/10; deferred payments, exchanges.—Jones, Garage, Broadway, Muswell Hill. [8227

1916 B.S.A., 4¼h.p., countershaft 3-speed gear box, new condition, complete, £55; also 1915 similar machine, with smart Burberry C.B. sidecar, and the usual equipment, £55; exchanges.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [8182

1913 B.S.A. 2-speed, two in stock, belt drive, also one chain drive, £30 each; deferred payments arranged. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. 'Phone: Hornsey 2562. [7700

1917 B.S.A.'s, all models from absolute stock; cash deferred, or exchanges, Douglases preferred. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. 'Phone: Hornsey 2562. [7702

4¼h.p. B.S.A., 1916 model, fitted with Canoelet sidecar, also fitted with Lucas dynamo lighting set, Lucas horn, with sidecar lamp and rear lamp complete, this combination is just like new; £77/10, guaranteed.—Wanchope's, B.S.A. City Agents, 9, Shoe Lane, Fleet St., London. [8120

B.S.A., latest new models in stock; chain drive model H, 3-speed countershaft gear, £66; chain-cum-belt model K, £64; Montgomery sidecars in stock to fit from 10 gns.; your present machine can be taken as part payment.—Elce and Co., 15-16, Bishopsgate Av., Cammomile St., E.C. [0551

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TRIUMPH, 3½ h.p., 2-speed countershaft, Sidecar ... £32
INDIAN, 1913, 7 h.p., coach-built Sidecar, 2-speed *£33
ZENITH, 1914, 6 h.p., countershaft clutch model £57
RUDGE, 1913, 5-6 h.p. Multi, with Rudge Sidecar £46
ENFIELD, 1912, 6 h.p., 2-speed, twin, Enfield Sidecar £29
RUDGE, 1913, 3½ h.p. Multi, coach-built Sidecar *£33
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JAMES, 4½ h.p., 1914, 3-speed, Empress Sidecar *£50
HARLEY-DAVIDSON, 1916, 7-9 h.p., Bramble Sidecar.*£84
SUNBEAM, 1915, 3½ h.p. Combination *£78
SUNBEAM, 1916, 3½ h.p. Combination £82

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DAIMLER 38 h.p. 2 Landaulette, C.A.V set.....*—
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MORGAN, 1913, 8 h.p., hood and screen.....*£60
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CALTHORPE, 1916, 10 h.p.,4 seat, dyna. and start £275
A.C., 1915, 10 h.p., dynamo, luxurious finish £265

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DOUGLAS, 1915, 2¾ h.p., 2-speed, model V.....*£43
DOUGLAS, 1914, 2¾ h.p., 2-speed *£45
DOUGLAS, W. O., 1915, 2¾ h.p., 2-speed £47
DOUGLAS, 1914, 2¾ h.p., 2-speed, and kick-start ..*£46
DOUGLAS, 1914, 2¾ h.p., 2-speed, Lucas horn *£47
TRIUMPH, 1912, 3½ h.p., clutch model, Bosch *£28
TRIUMPH, 1914, 4 h.p., 3-speed, Bosch.....*£48
TRIUMPH, 1912, 3½ h.p., Standard touriag *£26
TRIUMPH 1913, 3½ h.p., 3 speed, all accessories ...*£32
TRIUMPH, 1914 4 h.p., 3-speed (late date) *£48
TRIUMPH, 1909, 3½ h.p., delivered 12.12.08 ..... £19
TRIUMPH, 1914, 4 h.p., 3-speed, electric horn *£41
INDIAN, 1914, 7-9 h.p., clutch model, speedometer .*£40
INDIAN, 1915, 5 h.p., 3-speed, excellent condition ..*£48
INDIAN, 1914, 7-9 h.p., T.T. model, very fast *£41
B.S.A., 1916, 4½ h.p., 3-speed, mod. K., speedometer*£60
ENFIELD, 1911, 2¾ h.p. twin, 2-speed, chain drive..*£20
ENFIELD, 1911, 2¾ h.p twin, Grado gear *£14
HUMBER, 1914, 2¾ h.p. twin, light touring m[illegible]e*£17
HUMBER, 1914, 3½ h.p. 3-speed, water-cooled *£38
CALTHORPE, 1914 (late), 2¾ h.p., 2-sp., 2-str. [illegible] *£22
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IVY, 1915, 2¾ h.p., 2-stroke, Senspray carbure[illegible] £16
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Machines starred (*) are complete with lamps, horn, etc.
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ROYAL RUBY, 2½ h.p., 2-speed, 2-stroke £32 5
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COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799

2¼h.p. Calthorpe-Jap, Enfield 2-speed gear and free engine, in new condition, special engine; 26 gns — 30, Talbot St., Barnley. [X5690

CALTHORPE Junior, 1914; £15.—Tuke and Bell, Ltd., Motor Dept., Carlton Engineering Works, High Rd., Tottenham, N. [7457

CALTHORPE, 2¼h.p., 2-stroke Enfield 2-speed gear, free engine, new model, in stock; 34 gns.—Elce and Co., 15-16, Bishopsgate Av., Cammomile St., E.C. [0491

CALTHORPE, 3½h.p., 1914, 3 speeds, and new coachbuilt sidecar, speedometer, in exceptional nice condition; £34.—Percy and Co., 337, Euston Rd., London. [8175

4h.p. (August) 1916 Calthorpe-Jap, and sidecar, Enfield gear, electric light, mechanical horn, all in perfect order; any reasonable trial given; £55.—Springfield, High St., Sidcup, Kent. [8051

P. J. EVANS, Birmingham and District Agent.—Calthorpe 1917 models in stock; two-stroke and four-stroke lightweights, and 4-5h.p. twins, solo or as combination.—John Bright St. [8188

4½h.p. Calthorpe-Precision, Brampton gear and F.E., B. and B., Bosch, lamps, perfect tyres, new Watsonian Aero coachbuilt sidecar; sacrifice £27/10, or exchange light car.—276, Acton Hill, W. [8138

CALTHORPE-J.A.P.'s, 2-speed models in stock, 38 gns.; deferred terms if desired; 1915 2-speed and accessories, fine order, £27/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169, and Hornsey 1956. [8044

Campion.

CAMPION-J.A.P., 1916, 2-speed; £38/10, or near. —38, St. Peter's Hill, Grantham. [8023

Chater-Jap.

6h.p. Chater-Jap, drop frame, Bosch, drip feed, Palmers, sidecar chassis, wants assembling; bargain, £14.—Dunn, 35, Lyttleton Rd., Leyton, E. [8100

Chater-Lea.

CHATER-LEA 5h.p. Twin, racer; 15 gns.—Miss May, 66, Greyhound Lane, Streatham. [8091

CHATER 2-stroke, 4h.p., 2-speed, overhauled; £18/10; extended payments arranged.—Service Co., 292, High Holborn, London. [X5896

Clyno.

CLYNO 1912 6h.p. Combination; £35/10.—Motor Exchange, Horton St., Halifax. [7788

1914 2¼h.p. 2-stroke Clyno, scarcely used, all on; £27.—Wilkin and Co., Hunter's Bar, Sheffield. [X5944

CLYNO, 1914, No. 6 sidecar, recently overhauled, guaranteed; £65; extended payments arranged.—Service Co., 292, High Holborn, London. [X5897

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

1914 Clyno, 6h.p., 3 speeds, kick starter, 2-seated Millford sidecar, also tradesman's body, tyres and conditioo as new; accept £62/10.—E., 208, Camberwell Rd., S.E. [8101

Connaught.

CONNAUGHT, 2¾h.p., 4-stroke; £10.—65a, Rosendale Rd., Dulwich. [8057

CONNAUGHT, 1916, lamps, horn, new condition; £24.—32, High St., Peckham. [8151

1914 Connaught, 3 speeds, complete, lamps, etc.; £21. —Cross, Effingham Sq., Rotherham. [X5877

CONNAUGHTS.—1917 models in stock; medium weight and miniature models; prices from £28/17/6, shop-soiled model £27.—P. J. Evans, Birmingham and district agent, 87, John Bright St. [8194

BIRMINGHAM Agent, P. J Evans, John Bright St.—1917 models of the famous Connaught two-stroke, standard 2¾-3h.p. models, either solo or with sidecar; miniature models, single or 2-speed countershaft gear; prices from 27 gns. [8192

Coventry Eagle.

COVENTRY Eagle, 1915, single speed, guaranteed condition; £20; extended payments arranged.—Service Co., 292, High Holborn, London. [X5898

COVENTRY Eagle, 1916, 3-speed countershaft, coach sidecar, and accessories; cost £100, little used, £69/10.—Motor Exchange, Horton St., Halifax. [7789

Douglas.

1912 Douglas, 2 speeds, sound order; £22.—Cross, Jeweller, Rotherham. [X5878

MOTOR CYCLES FOR SALE.

Douglas.

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DOUGLAS, 1915, 2¾h.p., T.T., overhauled and re-enamelled; £44.—Below.

DOUGLAS, 1911 2¾h.p. twin, single-speed, re-enamelled and overhauled throughout; £18; extended payments arranged.—Service Co., 292, High Holborn, London. [X5900

DOUGLAS, 2¾h p., 1911; must sell; bargain, £10. —152, Camberwell Grove, Camberwell. [8162

DOUGLAS, 1914½, 2¾h.p., T.T., 2-speed, perfect throughout; 31 gns.—245, Hammersmith Rd., London, W. [8159

DOUGLAS, 2-speed, 1914, Philipson pulley, perfect; £38.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8076

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

DOUGLAS, 2¾h.p., fine order, new tyres, plating, enamelling new, only wants seeing; £17.—14, Dodbrooke Rd., West Norwood. [0869

2¾h.p. Douglas, 15 months, 1,775 miles, 3 speeds, Binks, Stewart, Miller, spares, accessories; £48. —40, Albert Grove, Southsea. [X5654

DOUGLAS, 1915, 2¾h.p., T.T., 2 speeds, Binks carburetter, accessories; £42/10; exchange higher power.—Pigot-Disney, East Molesey. [7855

1915 2¾h.p. 2-speed T.T. Douglas and accessories, in good condition; £42/10; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [8054

DOUGLAS Specialists.—Gibb, Gough, London Rd., Gloucester. Gibb, the International Douglas rider, winner of numerous cups and gold medals. [2218

DOUGLAS, late 1915, T.T., 2¾h.p., 3 speeds, lamps, and accessories, hardly used, exceptional condition; £48.—Vernon, Ember Lodge, Esher. [8073

DOUGLAS Model U, new July last, run less than 500 miles, complete with horn and 2 lamps; 50 gns.—Passey and Hall, Ltd., Ross, Herefordshire. [X5932

DOUGLAS, late 1913, T.T., 2 speeds, many improvements, fully equipped, perfect condition throughout; any trial; accept £29.—136, Dalmally Rd., Croydon. [8086

DOUGLAS, late 1913, T.T. model, 2-speed, lamps, speedometer, knee-grips, machine just overhauled, excellent condition; £30.—S. King, Chemist, Sutton, Surrey. [8164

DOUGLAS, 1914, 2¾h.p., 2-speed, fully equipped, speedometer, accessories, and spares; £37.—Pierrehusson, Primrose House Garage, Clarence Lane, Roehampton, S.W. [8149

1915 Douglas, 2¾h.p., model U, 3-speed gear, footboards, upturned or touring bars, lamps, horn, speedometer, in perfect order; £50.—Robinson's Garage, Green St., Cambridge. [8114

DOUGLAS, late 1916 model, 3-speed gear, footboards, and kick starter, only run few hundred miles, guaranteed perfect, and indistinguishable from new; £55.—Moss, Wem. [X5966

DOUGLAS, 2¾h.p.—Brand new models W (clutch, kick start) and U; deliveries in few days to doctors and farmers. Write for particulars.—Robinson's Garage, Green St., Cambridge. [8113

DOUGLAS, late 1914, 2¾h.p., 2-speed, T.T., Dunlop tyres, Autoclipse lamp set, knee-grips, long exhaust, all black, excepting engine and tank, very fast; £34.—Labram, 48, Priory Rd., Acton Green, W. [8213

DOUGLAS, model W, new December, 1915, clutch, kick-start, 2 Lucas lamps, horn, complete kit tools, pump, under 1,000 miles, excellent condition; £54/10.—Robinson's Garage, Green St., Cambridge. [8109

1914¾ Douglas, 2¾h.p., 2-speed, T.T. bars, long exhaust, electric horn, speedometer, lamps, done 6,000 miles, splendid engine, very fast, all accessories; £37/10; seen after 8.—42, Townshend Terrace, Richmond, S.W. [8066

DOUGLAS, 2¾h.p. Model O, 2-speed, footboards, late 1913, mileage 6,000, carefully used, tyres, enomel, plating good, P.H. and Lucas lamps, generators, horn, knee-grips, tool kit; price £30.—Rev C. Miller, Cheyne Cottage, Beaconsfield. [8211

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012

1917 2¾h.p. Edmund, spring frame (Levis engine), Enfield 2-speed; £52/10.—Wilkin and Co., Hunter's Sheffield. [X5940

RIDER TROWARD'S, 78, High St., Hampstead.—1917 Edmund-Jap, spring frame, Enfield gear, fully equipped; cost £50; mileage 100; illness cause sale; 41 gns. [8246

Enfield.

ENFIELD, 1916, 6h.p., and sidecar, as new, guaranteed; £78/10.—Below.

ENFIELD, 3h.p., done 120 miles only, unscratched, speedometer; £52/10; extended payments arranged. —Service Co., 292, High Holborn, London. [X5902

ENFIELD 1916 6h.p. Combination, new condition; 70 gns.—29, St. Leonards St., Bow. [8107

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2¾ h.p.	**CALTHORPE-J.A.P.,** 2-sp. featherweight (3 models in stock)	£39 18
2¼ h.p.	**NEW HUDSON,** Model C, 2-speed	£35 0
7-9h.p.	**HARLEY-DAVIDSON** Mod. 16F, and Sidecar	£102 9
2½ h.p.	**ALLDAYS ALLONS** (10 models in stock) from	£37 15 to £47 5
2¾ h.p.	**ROYAL RUBY,** single-speed	£32 10
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2½ h.p.	**JUNO-VILLIERS,** 1916, all access., mileage about 100	£33 10
4½ h.p.	**JAMES,** 1915, 3-sp., k/start, lamps, horn	£57 10
3 h.p.	**ROVER,** dry-cell battery ignition	£7 10
7-9h.p.	**HARLEY-DAVIDSON** Mod. 16F, Cancelet Sidecar and accessories	£89 10
2¾ h.p.	**CALTHORPE-J.A.P.,** 2-sp., ridden about 400 miles, and accessories	£35 10
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1¾ h.p.	**AUTO-WHEEL,** B.S.A. model	£12 12
2¾ h.p.	**CALTHORPE-J.A.P.,** 1915, 2-sp., and accessories	£27 10
2½ h.p.	**LLOYD-VILLIERS,** 1916, single-speed, with lamp, horn	£28 10
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COLMORE Depot, 31, Colmore Row, Birmingham for immediate delivery of Enfields. [0801

ENFIELD 3h.p. Twin, 2-speed, free, pedal start, good order, fast; £20.—14, Dodbrooke Rd., West Norwood. [0878

1914 Enfield 6h.p. Coachbuilt Combination, in good condition, spares, etc.; £58/10.—J. H. Merritt, Knottingley. [X5806

1917 6h.p. Enfield Combination, as new, only done 100 miles; £85; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [8055

6h.p. 1913 Royal Enfield and Sidecar, 2-speed gear complete with all accessories; £45; guaranteed.—Wauchope's, 9, Shoe Lane, London. [8128

£15.—Enfield twin lightweight, almost new; seen 9 to 6; first cheque £15, worth £20.—Liquidator, 6c, Lansdowne Hill, West Norwood. [8224

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock for immediate delivery.—See below.

1917 6h.p. Enfield Coachbuilt Combination, with apron and mat, 2 speeds, clutch and starter, 90 gns.; extra for hood and screen, £4/19; Lucas lighting set, 15 gns.; 8h.p. J.A.P. engine, £2 extra.—Below.

1917 3h.p. Enfield, solo or sidecar mount, 2 speeds, clutch, and kick starter; 55 gns.; sidecars from 7 gns.—Below.

1917 Enfield Two-stroke, 2¼h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright St., Birmingham. [8190

1916 Enfield Combination, very little used, £82/10; also 1913-14 Enfield coachbuilt combination, £57/10.—Collier's Motories, Deal St., Halifax. [7791

ENFIELD Combination, 90 gns.; 3h.p. twin, £57/10; 2-speed, 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

1914 6h.p. Enfield Combination, 3in. tyres, horn, lamps, tools, many spares, in splendid condition; £55; seen after 7, or week-ends by appointment.—Challis, 11, Allfarthing Lane, Wandsworth. [X5914

1915 Enfield, 3h.p. twin, 2-speed, kick starter, lamps, mechanical horn, footboards, splendid machine, and in new condition; bargain, £39; exchanges.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [8183

1915 2½h.p. Royal Enfield 2-stroke Lightweight, countershaft 2-speed chain drive, Palmer tyres, dropped top tube, exlellent condition throughout; £27 —The Premier Motor Co., Aston Rd., Birmingham. [8199

ENFIELD 1917 6h.p. Standard Combination, £94/10; 3h.p. solo, model T.T. touring, £57/15, actually in stock; 1916 dynamo lighting combination, hood and screen, like new, £98/10; 1916 commercial combination, new 2 months ago, ridden 400 miles, £87/10, all accessories; and two 1916 standard outfits, perfect condition, £85 each; heap accessories; deferred terms; exchanges. —Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169, and Hornsey 1956. [8045

Excelsior.

EXCELSIOR, 1916, 7h.p., 3-speed, and coach sidecar, used for demonstration; £69/10, cash bargain.—Motor Exchange, Horton St., Halifax. [7790

AMERICAN Excelsior, 7-9h.p., 3-speed, clutch, kick starter, brand new, with Empire sidecar, almost new; £80; exchanges.—Service Co., 292, High Holborn, London. [X5893

1914 Excelsior Combination, big single, 3-speed countershaft, in good condition; £35; or will exchange for good lightweight with cash; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [8053

1915¾ American Excelsior Outfit, sidecar 3 months old, 3-speed countershaft, hand and foot clutch, original fittings, mechanical horn; £60; lightweight or T.T. part exchange.—Motorist, 7, Waterloo Rd., Ipswich. [8166

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F.N.

F.N., 5-6h.p., 4 cyls., 2 speeds, and free engine, good order; 15 gns.—101, Devons Rd., Bow, E. [8141

1914 F.N., 5-6h.p., 4-cyl., 2-speed, clutch, wants cleaning; £17.—Meldon, 149, Colworth Rd., Leytonstone. [8061

F.N., 4-cyl., in excellent condition, with coachbuilt sidecar; best cash offer taken; exchanges and terms entertained.—Clark and Co., Motor Engineers, Doncaster. 'Phone: 176. [8074

Grandex.

RIDER TROWARD'S, 78, High St., Hampstead.—New 1917 Grandex-Precision, 4h.p., semi-T.T., in stock; 33 gns. [8245

RIDER TROWARD'S, 78, High St., Hampstead.—Grandex-Villiers, new, 1917 2-speed, 2-stroke, in stock; 33 gns. [8244

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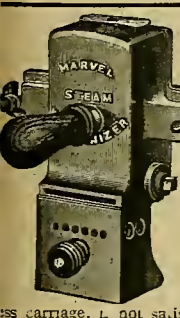

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GRIPPON, 2½h.p., B. and B. carburetter, pedal starter, good tyres; £5.—Maxim, 31, Hawthorne Rd., West Norwood. [0890

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INTENDING Purchasers are asked to carefully note that machines type 11F and 11J are 1915 models; 16F and 16J are 1916, and 17F and 17J are 1917 models. It is not possible to obtain 1917 model machines at less than our advertised list prices.

FULL Particulars of date and model of any machine will be readily furnished to enquirers giving engine number.—Herley-Davidson Motor Co., Ltd., 74, Newman St., Oxford St., W. [7997

BRAND New Harley-Davidsons (below).

MODEL 11F, 7-9h.p., 3-speed; £75.

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TO be obtained only from The Premier Motor Co., Aston Rd., Birmingham. [8201

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for immediate delivery 1917 Harley-Davidsons. [7863

1916 Harley-Davidson Combination, practically equal new; bargain, £85; seen 9 to 6.—Liquidator, 6c, Lansdowne Hill, West Norwood, S.E. [7974

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802

LATE 1915 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0861

HARLEY-DAVIDSON, 1915, 4-5h.p. clutch model, foot starter, guaranteed new condition throughout; £52.—P. J. Evans, John Bright St., Birmingham. [8198

HARLEY-DAVIDSON, one new 1916, 7-9h.p., 3-speed, model 16F, in stock; £84/15.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0552

HARLEY-DAVIDSON Combination, new June (1916), electrically equipped, only done 800 miles; bargain, £70.—8, Stockwell Park Walk, Brixton, London. [8095

HARLEY, 7-9h.p., 1916, mag., model, and sidecar, under 2,000 miles, guaranteed; £75; extended payments arranged.—Service Co., 292, High Holborn, London. [X5903

1915 Harley-Davidson, 11F, Bramble sidecar, Lucas head light, generator, and horn, tools, spares; £57/10, quick sale.—Langan, 292, Kingsland Rd., London. [8154

ALMOST New 7-9h.p. Harley-Davidson, with sidecar, delivered December, 1916, and only run 400 miles, 3 speeds, dynamo lighting; £67/10.—Box L3,095, c/o *The Motor Cycle*. [8230

HARLEY-DAVIDSON Late 1916 Model J Combination, electrically equipped, lighting and horn, speedometer, Pillion seat, all complete, equal to new, done about 500 miles; £93, no offers.—A.B., 107, Links Rd., Mitcham. [8033

HARLEY-DAVIDSONS.—Immediate delivery; new magneto models, £84/15; several second-hand 1915 and 1916 combinations from £65; exchanges arranged.—Colmore Depots, 31, Renshaw St., Liverpool, and 211, Deansgate, Manchester. [0885

RIDER TROWARD'S, 78, High St., Hampstead.—Harley-Davidson, 11J, 3-speed, coach sidecar, dynamo lighting, new July, 1916, mileage 1,500, 69 gns.; another, 11F, 1915, 7-9h.p., 3-speed, fully equipped, as new, 52 gns. [8239

HARLEY-DAVIDSONS.—Five genuine 1917 models actually in stock, electrically equipped, £102; standard model £93, model O sidecar £24/10, Model B £22/10 (only limited number available).—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8041

1916 Model 16J 7-9h.p. 3-speed Harley-Davidson, dynamo electric lighting outfit, fitted with special coachbuilt Gloria sidecar with spring wheel, luggage carrier, petrol can carrier, etc., enamelled to match, the finest outfit on the road; cost £120, and not done 500 miles, guaranteed as new; £85.—The Premier Motor Co., Aston Rd., Birmingham. [8202

Hazlewood.

HAZLEWOOD 1915 Twin Coach Combination, 5-6 h.p., 3-speed countershaft; £69/10.—Collier's Motories, Deal St., Halifax. [7792

Hobart.

HOBART, 2-stroke, Villiers engine, 2-speed, Dunlop tyres, all accessories, new September last, not done 100 miles; £30.—Laughlin, 213, Rye Lane, Peckham. [8028

6h.p. Hobart-Jap 1915 Motor Cycle, competition engine, Sturmey countershaft gear, coachbuilt Bramble sidecar, spares, accessories; £62; selling through ill-health.—May Walker, Redbourn, St. Albans. [X5849

Humber.

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882

2h.p. Humber, in good condition throughout; £12/10.—H. Teesdale, Helperby, York. [X5892

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MOTOR CYCLES FOR SALE.

Humber.

HUMBER, 3½h.p., 1912, rebushed, requires new pulley; £15.—Haywood, Cedars, Byfleet, Surrey. [X5835

HUMBER, 1917, latest models, 3½h.p. and 6h.p. horizontal twins, actually in stock.—Moss, Wem. [X5965

1914 3½h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863

1917 3½h.p. and 6h.p. Horizontal Twin Humbers; delivery from stock.—Wilkin and Co., Hunters Bar, Sheffield. [X5935

HUMBER.—P. J. Evans.—Delivery from stock, 1917 horizontal 3½h.p. twin, special W.D. finish.—John Bright St., Birmingham. [8189

HUMBER, 1915, 3½h.p., 3-speed, nearly new; special price, £57/10.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0842

HUMBER, 1913, Sturmey-Archer Mark XX., just overhauled, comfortable sidecar, lamps, horn, etc.; bargain, £31/10.—Fleming, St. Nicholas St., Leicester. [X5852

1917 3½h.p. Horizontal Twin Humber, handle-bar controlled clutch, T.T. bars, latest model, brand new; in stock; £75.—Robinson's Garage, Green St., Cambridge. [8112

WAR Bargain.—Late 1914 3½h.p. 3-speed Humber and coachbuilt sidecar, wind screen, Mills-Fulford chassis, 2 lamp sets, all accessories, exceptional condition; £38; trial owner called up.—E., 23, Market Place, Kingston, S.W. [8094

Indian.

1914 7-9h.p. 2-speed Indian Combination, with electric equipment; £40.—20, Whitley St., Reading. [8210

5h.p. Indian Combination, 1915, perfect condition; £55; Fulford 19 gn. sidecar.—Brown, Belle Vue, Thetford. [X5868

INDIAN, 5h.p., September, 1915, 3-speed, sporting sidecar, complete; 48 gns.—Mere House, Newton-le-Willows, Lancs. [X5866

INDIAN, 1915, 3½h.p., and sporting sidecar, 3 speeds, kick starter; £44.—Seen at Clayton's Garage, Melbourne Rd., Wallington, Surrey. [8105

1916 5h.p. Indian, 3-speed, T.T. handle-bars, done 1,000 miles; any trial by appointment; £57.—Eveson, The Dingle, Stourbridge. [X5660

INDIAN Powerplus Model G, all accessories, splendid machine; £72; extended payments arranged.—Service Co., 292, High Holborn, London. [X5904

INDIAN, 1916 (September), 5h.p., 3 speeds, clutch, and kick starter, new condition; 60 gns.—P. J. Evans, John Bright St., Birmingham. [8195

INDIAN Motor Cycle, 3½h.p., 2 speeds, with free engine clutch, nearly new, minus handle-bar and carburetter; £20, or close offer.—Eagles and Co., High St., Acton. [X5885

INDIAN Late 1915 5h.p. 3-speed Combination, as new, and thoroughly equipped; accept for immediate sale £55.—Longman Bros., King St., Acton. 'Phone: 1378 Chiswick. [8144

1915-16 5h.p. Indian Combination, kick-starter, 3-speed, accessories, almost new; £65; exchanges considered; seen 9 to 6.—Liquidator, 6c, Lansdowne Hill, West Norwood, S.E. [8225

INDIAN Combination, 1915, 7-9h.p., in makers' hands this year for renewals and adjustments; first and last cost £65; photograph.—Jeffery, 52, Cumberland Rd., Acton, Middlesex. [8215

1916 7h.p. Powerplus Indian Combination, spring frame, electric lamps and horn, 3-speed, clutch, speedometer, done 1,600 miles, splendid condition; £80.—Maddock, Oakengate, Shropshire. [X5880

INDIAN Combination, 1916, 7-9h.p. Powerplus model O, semi bars, Indian de Luxe sidecar, guaranteed perfect, used for demonstration purposes only; £82/10.—Page and Scott, Military Rd., Colchester. [X5655

1916 (July) 5h.p. Indian, 3-speed, mechanical horn, lamps, scarcely used, done 400, tyres and enamelling unscratched, beautiful condition; £55; insurance policy optional.—Lord, Mountfield, Prestwich. [X5857

Ivy.

RIDER TROWARD'S, 78, High St., Hampstead.—1915 Ivy, 2-speed, 2-stroke; cost £38, 24 gns.; perfect. [8237

IVY-PRECISION, 4½h.p., in fine order and condition; £20.—Maxim, 31, Hamthorpe Rd., West Norwood. [0871

IVY 2-stroke, 1915, overhauled, all lamps and accessories; £24; extended payments arranged.—Service Co., 292, High Holborn, London. [X5905

James.

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803

JAMES 2-strokes. 1917 models, for immediate delivery.—Colmore Depot, 211, Deansgate, Manchester. [0888

1913 James, and cane sidecar, in first-class condition, 2-speed, and kick start; £36.—Mr. Emmett, Healey, Batley. [X5804

JAMES 3½h.p. Twin, 3-speed countershaft, h.b.c., clutch, lamps, generators, spares, 1914-15 model, splendid condition; £36.—175, St. Alban's Rd., Watford [X5834

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2½ h.p. **EXCELSIOR,** 2-stroke, 2-speed .. £39 5
2½ h.p. **EXCELSIOR,** 2-stroke, single gear £30 16
2½ h.p. **NEW IMPERIAL,** lady's model, No. 4, 2-speed, clutch, and kick-starter £50 8
2½ h.p. **NEW IMPERIAL,** Model No. 2, 2-speed, clutch, and kick-starter £48 8
2½ h.p. **NEW IMPERIAL,** Model No. 1, 2-sp. £40 19
2½ h.p. **EDMUND-J.A.P.,** 2-sp., spri'g frame £48 10
2¾ h.p. **ALLON,** 2-stroke, 2-sp. gear, clutch, brake, and chain guards £48 0 9
2¾ h.p. **ALLON,** 2-stroke, 2-sp. gear, and chain shields £44 17 9
2½ h.p. **LEVIS,** 2-sp., Model E, chain drive £47 10
2½ h.p. **LEVIS,** 2-stroke, Popular model .. £32 0
2½ h.p. **DIAMOND-J.A.P.,** Enf'ld 2-sp. gear £40 19
2½ h.p. **SPARKBROOK,** 2-stroke, 2-speed £40 0
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JAMES, 1915 model No. 6 combination, 4¼h.p., 3-speed, lamp, horn, speedometer; £57/10; easy terms, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8040

JAMES, 1917 models, for immediate delivery from stock. Big "Four" combinations, with and without Lucas dynamo lighting set; 3½h.p. twin, and two-stroke models.—P. J. Evans, John Bright St., Birmingham. [8188

J.A.P.

1914 3½h.p. Twin J.A.P., 3-speed, Bosch, Amac, Dunlops, Druids, with wicker sidecar, all accessories, and quantity of spares; £30, or exchange.—Box L3,082, c/o *The Motor Cycle.* [8035

J.E.S.

1h.p. J.E.S., smart lightweight, in nice condition; £15/15, bargain.—Wauchope's, 9, Shoe Lane, London. [8124

Kerry.

3½h.p. Kerry, 2 speeds, and free engine, good running condition; 19 gns.—30, Talbot St., Burnley. [X5889

KERRY, 5h.p. twin, overhauled and re-enamelled, in nice condition; £10/10.—Percy and Co., 337, Euston Rd., London. [8173

3½h.p. Kerry-Abingdon, free engine, Bosch mag., etc., perfect, £15; sidecar, £3/10.—Smith, 199b, King St., Hammersmith. [8129

Lea-Francis.

1914 Lea-Francis, 3½h.p. twin J.A.P., 2-speed gear, countershaft, complete with lamps, tools, and accessories, tyres in good condition; £32; can be seen in London.—Goslett, The White Cottage, Hatch End. [8006

Levis.

LEVIS, latest, brand new, single and 2-speed models in stock.—Moss, Wem. [X5962

LEVIS 2½h.p. Popular, late 1915, in first-class order; £22.—14, Dodbrooke Rd., West Norwood. [0895

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804

LEVIS, late 1915, just overhauled, splendid condition; 20 gns.—Bright, 4, Triangle South, Clifton, Bristol. [X5976

1915 2½h.p. 2-speed Levis, splendid condition, lamps, horn, etc.; £30.—Wilkin and Co., Hunter's Bar, Sheffield. [X5938

LEVIS, 2½h.p., 1916, standard model, complete with all accessories, and in perfect condition; £25/10.—Dominy, Jewry St., Winchester. [8137

1917 Popular and Model E Levises; delivery from stock; cash, exchanges, or easy payments.—Wilkin and Co., Hunter's Bar, Sheffield. [X5937

LEVISES.—Both these popular models actually in stock; liberal exchanges, deferred payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8048

1916 Popular Levis, Miller and Lucas lamp sets, horn, new studded Dunlop, perfect condition throughout, spare tube, 8 gallons petrol, privately owned; £25.—Seen Haskins, City Rd., Bristol. [X5653

1914 Levis Baby, in fine order and condition; a rare bargain, £19. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7695

LEVIS, 1914, 2¼h.p., has not been ridden for 18 months, owner on active service, good tyres, machine unscratched, all accessories; seen and tried any time; £18.—Wm. Hurlock, Jun., Ltd., 63, Denmark Hill, S.E. [8155

Matchless.

MATCHLESS Motor Cycles; no quicker delivery obtainable than from Colmore Depots. [0881

MATCHLESS, 1912, 6h.p., 2-speed, pedal start, underslung coach sidecar; £24.—29, St. Leonards St., Bow. [8106

3½h.p. Matchless, in good order, new tyres, generator and lamps; £22, or exchange 2-stroke.—C. Coppen, Parsloes Farm, Chadwell Heath, Essex. [8031

MATCHLESS Coach Combination, 1913, 8h.p. J.A.P., 2-speed, free engine, good running order; Overseas soon; offers; Sheffield.—Box 700, c/o *The Motor Cycle.* [X5824

MATCHLESS, 1914, 3-speed gear model, fitted with coachbuilt sidecar to match, complete with accessories; £35, guaranteed.—Wauchope's, 9, Shoe Lane, London. [8122

MATCHLESS 7-9h.p. M.A.G. Combination, 3-speed, kick-start, enclosed chain drive, Lucas lamps, complete, guaranteed; trial; £65 cash.—Hallam, Rosedale, Dove Holes, Stockport. [X5970

8h.p. Matchless and Turner coachbuilt sidecar, hood and screen, luggage grid, new 1914 spring forks, complete, less engine; nearest £10, with tyres.—J. Parker, 231, Audley Range, Blackburn, Lancashire. [X5927

MATCHLESS, 1915, 7-9h.p. M.A.G. engine, complete with best Matchless sidecar, 2 carburetters for running on substitute, P. and H. lamps, Stewart horn, practically new tyres, spares; £75; extended payments arranged.—Service Co., 292, High Holborn, London. [X5907

MOTOR CYCLES FOR SALE.

Minerva.

MINERVA, 2¼h.p., £6/10, good running condition; owner joining the army.—Donilliez, 19, Tryon St., Chelsea, London. [8030

MINERVA, 8h.p. twin, Bosch, N.S.U. 2-speed, free engine, sidecar, new tyres and belt, sound condition, fast; £15 cash.—Box L3,035, c/o *The Motor Cycle*. [7769

FOR Immediate Sale, 2¾h.p. Minerva motor cycle, spring forks, good tyres and belt, Bosch mag., new tank, horn, etc.; best offer accepted.—MacTavish, 27, East St., Epsom. [8027

Motosacoche.

2¼h.p. Motosacoche, 1913, good condition, Nirona 2 lamp set, all accessories; what offers?—308, St. Paul's Rd., Highbury Corner, N. [8142

New Hudson.

1913 3½h.p. New Hudson, 3-speed, and Montgomery coachbuilt sidecar; £32.—Wilkin and Co., Hunter's Bar, Sheffield. [X5942

NEW Hudson, 2¼h.p., 2-speed, 2-stroke; £38.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0840

NEW Hudson Combination, coachbuilt, 3-speed, kick start; bargain, £38.—W. and H. Motor Co., Ltd., 287, Deansgate Manchester. [8077

NEW Hudson, 1912-13, J.A.P. 2¾h.p., 3-speed, all accessories, £18/10; also light sidecar to suit, £1/10.—Lamb's, 151, High St., Walthamstow. [8047

NEW Hudson 1913 3½h.p. Combination, 3 speeds, clutch and starter, good condition, £28; 1912 combination, £22.—P. J. Evans, John Bright St., Birmingham. [8187

NEW Hudson, 1915, 3-speed countershaft, War Office model, all accessories, splendid outfit; £48; extended payments arranged.—Service Co., 292, High Holborn, London. [X5906

1915 4h.p. New Hudson and Sidecar, 3-speed countershaft gear box, all in splendid order and condition, all lamps, etc.; £52; deferred payments arranged. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7705

New Imperial.

NEW Imperial-Jap, 1916, 2¾h.p., 2-speed, shop-soiled only; sacrifice £35.—Below.

DITTO, 1916, complete with P. and H. lighting set under 600; £32/10.—Page and Scott, Military Rd., Colchester. [X5651

NEW Imperial, 2½h.p., 2-speed, and kick start models just arrived.—Gittins, Ltd., Oswestry. [X5401

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Imperial-Japs. Immediate delivery. [7862

RIDER TROWARD'S, 78, High St., Hampstead.—New Imperial, 1915; cost £38, 24 gns. [8243

NEW Imperial, 2¾h.p., 2-speed, just delivered from works; 39 gns.—Dominy, Jewry St., Winchester. [8136

COLMORE Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0805

1916 New Imperial-Jap, 2½h.p., 2-speed, all black, only wants cleaning; owner enlisted; £28.—5, Park Av., Palmer's Green. [8153

IMPERIAL-J.A.P., 1916, 2-speed, only run 3 months, speedometer; £39.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8079

NEW Imperial 1917 Models for immediate delivery; model 1, 39 gns., No. 2 46 gns.; several second-hand 1916 machines from £30.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0886

NEW Imperial 1917 Models in stock; light tourist, 2 speeds, countershaft, 38 gns.; clutch and kick starter models, also ladies' models ready to drive away.—P. J. Evans, Controlling District Agent, John Bright St., Birmingham. [8196

NEW Imperial, 3½h.p., 3 speeds, clutch, kick starter, chain and belt drive, cost with accessories £63; new from works only 3 months ago, mileage 290 miles; owner joining up; nearest offer to £55 accepted. Brown, Isles Lane, Knareshorough. [X5762

Norton.

1916 3½h.p. T.T. Norton, perfect condition; £45.—Wilkin and Co., Norton Agents, Hunter's Bar, Sheffield. [X5936

NORTON, 1914, sports, Philipson pulley, h.b.c., brand new Dunlop tyres and belt, new engine parts 1917, very fast; buyiog sidecar; £35, near.—Ellis, 73, Victoria Rd., Penny Stratford. [8001

N.S.U.

1914-13 N.S.U., 6h.p., 2-speed, kick-start, clutch, spring frame, Williamson sidecar; £32; exchange lower power.—Musedale, 30, Canterbury Rd., Kilburn, London. [8157

O.K.

O.K.'s in stock, M.A.G. £42/10, J.A.P. £38.—Youngs, 2 and 3, The Parade, High Rd., Kilburn [5931

1914½ O.K. Junior, 2-speed countershaft, perfect condition; £18.—13, Chester Rd., Macclesfield. [X5915

1915 O.K., 4-stroke, 2-speed, splendid condition, 120 m.p.g.; 19 gns.—436, Whitehorse Rd., Thornton Heath. [8206

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P. and M.

1912 3½h.p. P. and M., and sidecar, lamps, horn, and speedometer; £32.—Wilkin and Co., Hunter's Bar, Sheffield. [X5943

Peugeot.

PEUGEOT, 2¾h.p., Bosch, running order; £9.—65a, Rosendale Rd., Dulwich. [8058

6h.p. Twin Peugeot and Sidecar, mag., starter, Multi gear pulley, spring forks, tyres good condition; £20.—7, Hazlemere Rd., Swansea. [X5960

PEUGEOT 5h.p. Twin, N.S.U. 2 speeds, perfect running order and condition throughout; £17/10.—Percy and Co., 337, Euston Rd., London. [8171

Precision.

RIDER TROWARD, 78 High St., Hampstead.—1914 Precision (Rolfe), 8h.p., 3-speed countershaft, clutch, kick-start, coach sidecar, hood, screen, luggage grid, cost £100, 45 gns.; 1914 Lugton-Precision, T.T., clutch model, 21 gns.; 1914 Torpedo-Precision, 4h.p., 23 gns. [8240

Premier.

PREMIER, 3½h.p., 1912, reliable machine, new condition; 15 gns.—245, Hammersmith Rd., London, W. [8160

PREMIER, 1912, 3½h.p., 2 speeds; £21/10, or with sidecar £25/10.—Motor Exchange, Horton St., Halifax. [7793

1914 3½h.p. Premier, 2 speeds, coachbuilt sidecar; £45; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0823

PREMIER 7-9h.p. Motor Cycle and cane sidecar, and wind screen, 3-speed countershaft gears, perfect condition.—Hampshire, Ironmonger, Holmfirth. [8018

PREMIER Combination, 1915, 3½h.p., 3-speed counter-shaft, W.O. model, racing sidecar, usual accessories, excellent condition; £45; appointment.—172, Brownhill Rd., Catford, S.E. [8068

1914 Premier, 3½h.p., 3-speed countershaft gear box, and sidecar, very comfortable machine, been perfectly kept in splendid order and condition; £47; deferred payments arranged. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7707

1914 (late) 3½h.p. Premier, 3-speed countershaft, with luxurious Swan sidecar, Lucas head and rear lamp sets, Hellesen electric on sidecar, Jones speedometer, mechanical and bulb horns, spare Zilla belt, chain, tube, valve, plug, etc., new Binks, overhauled by makers June last, new condition; trial willingly; £45.—Abell, Dunstable, Beds. [X5820

Quadrant.

QUADRANT, 3½h.p., spring forks, mag., good tyres and belt, good order, and fast; £12.—14, Dodbrooke Rd., West Norwood. [0872

RIDER TROWARD'S, 78, High St., Hampstead.—1914 Quadrant, 3-speed, 26 gns.; 1913 Quadrant, 2-speed, 24 gns.; both perfect. [8242

4¼h.p. Quadrant, 1915, and coachbuilt sidecar, 3-speed B.S.A. countershaft gear, kick-start, and free engine; £45; guaranteed.—Wauchope's, 9, Shoe Lane, London, E.C. [8117

Radco

RADCO, 2¼h.p., late 1915, practically unused; £16, no offers.—14, Dodbrooke Rd., West Norwood. [0896

RADCO, 2-stroke, tyres, belt, tubes, mudguards new, lamps, etc.; £18/10.—Knighton, Coleorton, Leicester. [8052

Rex

REX 6h.p. 2-speed Combination, Bosch, Binks, coach sidecar, handle starting, nearly new tyres and belt; £30.—Address, 13, Park Av., Skipton. [X5922

REX, 6h.p., 2-speed, clutch, as new, and torpedo sidecar (new), will exchange for Douglas or sell £38.—Peacock, Waterworks, Higham, Rochester. [8214

REX, latest model, 2 speeds, coach combination, £49/10; 1913 6h.p. 2-speed Rex Sidette, £36/10; 3½h.p. magneto model, £14/10; 5½h.p. twin, £13/10.—Motor Exchange, Horton St., Halifax. [7795

MOST Exceptional Bargain.—Genuine late 1912, bought new 1913, 6-8h.p. Rex, 2-speed, handle starting, all accessories, and handsome cane sidecar, guaranteed in first-class condition, not used during last 20 months; accept £25, or exchange for late model 2-stroke and cash.—Brown, Gloucester Rd., Chesterfield. [X5919

Rex-Jap.

ONE Only, 1916 6h.p. Rex-Jap, new, but slightly shop-soiled, countershaft 3-speed gear, enclosed chain drive, kick starter, h.b.c. clutch, 650×65 tyres, fitted with special Canoelet sidecar, 4-point attachments; £80 cash; catalogue and full particulars free on request.—The Premier Motor Co., Aston Rd., Birmingham. [8203

Rover.

ROVER New 1917 Latest Combination, solo, and T.T. models in stock.—Moss, Wem. [X5963

COLMORE Depots, Birmingham and Manchester, for quickest delivery of Rover motor cycles [0883

ROVER, 1913, 3½h.p., 2-speed, clutch model, and sidecar; £29/10.—Motor Exchange, Horton St., Halifax. [7796

1917 Rovers, T.T., countershaft and touring models; delivery from stock.—Wilkin and Co., Hunter's Bar, Sheffield. [X5939

MOTOR CYCLES FOR SALE.

Rover.

ROVER Combination, 1917 model, new, for immediate delivery; £89/9.—Colmore Depot, 211, Deansgate, Manchester. [0887

ROVER, 1915, 3½h.p., 3-speed countershaft, speedometer, lamps (Lucas), tools, horn, etc., guaranteed; £50.—Below.

ROVER, 1914, T.T., overhauled, re-enamelled throughout, splendid mount; £25; extended payments arranged.—Service Co., 292, High Holborn, London. [X5909

BIRMINGHAM Agent for Rovers, P. J. Evans, John Bright St.—1917 models in stock for immediate delivery.—See below.

1917 3½h.p. Rover Coachbuilt Combination, 3-speed countershaft gear, De Luxe sidecar; 90 gns.—Below.

1917 3½h.p. Rover, sporting model, racing or semi racing handle-bars; £57/10; extra for hand-controlled Pulipson pulley, £4/10.—P. J. Evans, John Bright St., Birmingham. [8191

1917 Rover Combinations, 1917 Rover 3-speed, countershaft.—W. Brandish, Charles Garage, Foleshill Rd., Coventry. [X5987

ROVER, 3½h.p., 1912, free engine, and coachbuilt sidecar, in real good order; £22, Percy and Co., 337, Euston Rd., London. [8181

ROVER Coachbuilt Combination, 3½h.p., 3 speeds, clutch, excellent condition; £48.—P. J. Evans, John Bright St., Birmingham. [8197

ROVER, new 1915, 3-speed, 3½h.p., absolutely equal to new, just overhauled, mileage under 3,000; £38.—Longman Bros., King St., Acton. [8146

ROVER Coachbuilt Combination, 1914-15, Sturmey 3-speed, lamps, horn, speedometer, beautiful condition, as new; £55.—Westley, Outfitter, Hales St., Coventry. [X9584

1912 3½h.p. Rover, Sturmey-Archer 3-speed, good tyres, with art cane sidecar, lamps, horn, speedometer, complete; £25.—Robinson's Garage, Green St., Cambridge. [8111

ROVER, 1913, 3½h.p., 3-speed, free engine, speedometer, lamps, horn, and accessories, Stelastic back tyre, in excellent condition; can be seen by appointment.—Bewsher, 173, St. James' Rd., Croydon. [8103

Royal Ruby.

ROYAL Ruby, 2¾h.p. J.A.P., 2-speed gear, late 1916 model, mileage 200, in perfect condition; £36.—Parker, Collin Croft, Kendal. [X5469

ROYAL Rubys actually in stock, £32, £40, and £46 each; exchanges entertained, deferred terms.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8042

Rudge.

RUDGE, 1912-13, T.T., £20 cash.—William Marshall, Martin Dales, Lincoln. [X5778

3½h.p. Rudge Multi; £75; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0864

1912 3½h.p. Rudge, free engine, good condition; £25—R. E. Jones (Garages), Ltd., Swansea. [0785

RUDGE, 3½h.p., 1913 model; 20 gns.—Capt. E. Gait, Box L3,094, *c/o The Motor Cycle.* [8231

RIDER TROWARD'S, 78, High St., Hampstead.—1913 T.T. Rudge, special engine, very fast; 22 gns., bargain. [8247

1915 Isle of Man Rudge Multi, clutch, little used; owner in France; £45.—Particulars, Kendall, Ellesmere, Salop. [X5862

1913 3½h.p. Rudge, Multi gear, in perfect going order, and fast; £25, or near offer.—E. Bowden, Slinfold House, Bookham, Surrey. [8093

RUDGE, 1912, 3½h.p., 2-speed, coach sidecar, £29/10; 1913 3½h.p. Rudge Multi, new coachbuilt sidecar, £37/10.—Motor Exchange, Horton St., Halifax. [7794

1912 3½h.p. Rudge Multi, condition good, ready for road, all accessories; £25 to quick buyer.—Further particulars, Horne, Broughton Rd., Skipton, Yorks. (D) [8089

3½h.p. Rudge Motor, new 1916, with free engine, variable Rudge pulley, handles broke; £34; will buy T.T.—Write, Oakes, 4, Antrobus St., Winnick Rd., Warrington. [X5883

1913 3½h.p. Rudge Multi (1916 improvements), and coachbuilt sidecar, complete with screen, lamps, horn, and speedometer; £38.—Wilkin and Co., Hunter's Bar, Sheffield. [X5941

1915½ 3-speed 3½h.p. Rudge, foot and hand clutch, Lucas lamps, Stewart horn, 100 m.p.g., and sidecar; £48/10; after 6 p.m.—Dafern, 121a, Godolphin Rd., Shepherd's Bush. [X5980

RUDGE Multi, 1915, 5-6h.p., excellent condition, with light coachbuilt sidecar, speedometer, all lamps, etc.; £45.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [8145

1915 3½h.p. Rudge Multi, with sidecar, lamp, speedometer, in sound order; any trial; genuine bargain, must sell, going on service, £44 cash, or nearest.—Apply, John Cooke, Little Royd, Huddersfield. [8216

Scott.

COLMORE Depots, Birmingham, and Manchester, for Scott motor cycles. [0806

NEW MODELS FROM STOCK.

ALLON, 2-stroke, 2-speed	£42	0
B.S.A., 4¼ h.p., 3-speed, chain drive	£66	0
B.S.A., 4¼ h.p., 3-speed, model K	£64	0
BROUGH, 3½ h.p., T.T. model, 2-speed	60 gns.	
CALTHORPE, 2-stroke, 2-speed	33 gns.	
CALTHORPE-J.A.P., 2¾ h.p., 2-speed	28 gns.	
ENFIELD, 2-stroke, 2-speed	42 gns.	
ENFIELD, 3 h.p., twin, 2-speed	65 gns.	
ENFIELD, 6 h.p., Combination	90 gns.	
ENFIELD, 6 h.p.. Combination, with Lucas dynamo lighting set	105 gns.	
JAMES, 2-stroke, 2-speed	£42	0
JAMES, 3½ h.p., twin, 3-speed	£69	0
JAMES, 4¼ h.p., Combination	£86	0
LEVIS Popular, 2½ h.p., 2-stroke	£32	0
NEW IMPERIAL, 2½ h.p., 2-speed	39 gns.	
NEW IMPERIAL, 2½ h.p., 2-sp., clutch and kick-starter	46 gns.	
ZENITH-GRADUA, 3½ h.p., twin	£62	0

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We specialise in exchange transactions, and will allow full value for your old Motor Cycle or Light Car in Part Payment for any new one

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MATCHLESS, 1913, 8 h.p., 2-speed, clutch, & kick-starter, all accessories	£38	0
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CALTHORPE, 1915, 2¼ h.p., 2-stroke, 2-speed, headlight, rear lamp, horn, and speedometer	£28	0
VINDEC, 1911, 5 h.p., 2-speed, headlight, rear lamp, horn and coachbuilt Sidecar	£22	0
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ROYAL ENFIELD, 1914, 3 h.p., twin, 2-speed	£32	0
DOUGLAS, 1910, 2¾ h.p., lamps and horn	£15	0
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NEW IMPERIAL-J.A.P., 2¼ h.p., T.T. model, 2-speed, Cowey speedometer	£33	0
ALLON, 1916, 2¾ h.p., 2-stroke, 2-speed, Lucas lamps, and horn	£38	0
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SCOTT, 1913, and sporting coachbuilt sidecar, in real good order and condition; £32.—Percy and Co., 337, Euston Rd., London. [8172

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SINGER, 1913, 3½h.p., 3 speeds, coachbuilt sidecar; £33/10.—Motor Exchange, Horton St., Halifax. [7797

SINGER, 2h.p., Bosch, B. and B., Druids, M.A.C., overhauled, excellent condition; £15.—Head, 31, Hainthorpe Rd., West Norwood. [8133

SINGER, 3½h.p., 1914, Bosch, B. and B., decompressors, splendid tyres; any trial or examination by appointment; £15.—Price, 141, Butt Rd., Colchester. [8025

Sun.

COLMORE Depots, Birmingham and Manchester, for delivery from stock of all models of Sun motor cycles. [0807

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3½h.p. Sunbeam, 1915 model, very little used, fitted with handsome coachbuilt sidecar, complete with Lucas lamps, and speedometer; £85; condition like new, guaranteed.—Wauchope's, 9, Shoe Lane, London. [8125

SUNBEAM 1914 6h.p. Combination, splendid condition, Lucas lighting set and horn, speedometer, leg shields, pillion seat, Gloria sidecar, wind screen, detachable child's seat, coachbuilt luggage box to fit chassis, spare tube, first-class order; 75 gns.—Axten, Glengarriff, Surrey Rd., Harrow-on-Hill, Middlesex. [8218

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DE LUXE T.D.C., 1915, 2¾h.p., 2-stroke; first offer £17; nice mount.—Smiths, Motors, Girvan. [8083

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IF You Want a Triumph, try the Walbro Garage, below

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The Petrol Position—Suggested Refund of Licence Fees.

THE bombshell dropped by the Petrol Committee last week was not entirely unexpected in some quarters. We do not quarrel with the Government's decision if the conditions demand such a drastic step, but we do strongly protest against the Order being issued immediately after January, during which month licences had to be paid on motor vehicles. The Post Office accepted the amount without demur, yet the licences distinctly state that they continue in force until the 31st of December.

It has been suggested by many of our readers that the Government officials have set a trap to get their licence fees first and then to announce that no more petrol will be forthcoming after March. There certainly is a *prima facie* case to this effect, but we incline to the view that it is a case of bad bungling due to lack of proper co-ordination between the departments concerned. Nevertheless the result is the same. Do the authorities imagine that motor cyclists are willing to pay a full year's licence for a quarter of a year's riding?

The Government cannot in justice retain in full the fees which have been paid this year, yet it will mean a great deal of trouble and delay, and much clerical work in Government Departments which a little imagination on the part of those in authority could have avoided. We feel that it is the duty of the different organisations which exist for the protection of motorists' interests to get to work immediately. If no petrol or petrol substitutes are available after March then threequarters of the tax paid should be refunded. It is a perfectly reasonable and legitimate request, for pleasure motoring nowadays is unknown, though we have always contended that a little recreative motoring is beneficial to body and mind, and quite as justifiable as railway trips to the seaside or other health resorts. Business men find that they cannot get on without a motor vehicle of some sort, and naturally in these economical days they turn to the cheapest forms of motor vehicles, particularly the motor cycle, which is cheaper than travelling by train. Will the Petrol Committee admit that men who apply their machines to business uses are doing so in the national interest? What of the case of men who live in the country; will they be made to adopt the Government's idea of economy and lose time by walking far and then journey by train?

The Utility Side.

Of course, motoring will not cease entirely. The motor vehicle has demonstrated too thoroughly its utility and importance for it to be dispensed with altogether. It is part of our everyday life. Motor cycles are largely used by men engaged upon work of national importance about which there can be no dispute. We have in mind doctors, veterinary surgeons, farmers, gardeners who have to inspect widely-separated tracts of grounds, builders engaged upon urgent Government buildings in outlying districts, Government examiners and inspectors. Again, supplies should be forthcoming for the National Motor Volunteers, the special constabulary, and people connected with the British Red Cross and V.A.D. services, also trade firms engaged in the development of designs. Thus it will be seen that the motor cycle permeates the most important channels of utility, so to suggest that motor cycling is to cease is a gross exaggeration of the position. As we have said, what we object to, and that most emphatically, is the suspicious delay, until the licences were paid, of an announcement which must have been settled weeks ago. Our readers use very strong terms at the injustice done to them, and the mention of the fact will serve to show the Government that their action is very strongly resented, and is not likely to produce that popularity and support which we could all hope to see exist.

An index to the advertisements in this issue will be found on the page facing the back cover.

MACHINING A CYLINDER.

How this Difficult Operation may be Performed at Home with Suitable Tools.

AT the present time, when such great difficulty is experienced in obtaining new parts for a motor cycle, to say nothing of the cost of them, the following description of how I machined up a cylinder for a Triumph motor cycle engine may be of interest to other riders, more especially to the fortunate possessors of the necessary tools for carrying out the work.

Having frequently noticed cylinder castings advertised in the columns of *The Motor Cycle*, and finding them of suitable dimensions for my requirements, I secured one.

The first operation consisted of plugging the small hole in the compression tap boss at the top of the casting and then finding the centre of the cylinder by reference to the outside curve of the radiating fins. A ⅛in. hole was then drilled at this point to accommodate the back centre of the lathe during the process of turning the spigot of the cylinder and facing both sides of the square flange, for which operation the casting was mounted on a four-jaw chuck. Four holes were next drilled in the square flange for the holding-down studs, the holes being marked off by means of a sheet iron template.

Boring the Cylinder.

For the purpose of setting up the cylinder for boring, a circular piece of boiler plate ½in. thickness and about 12in. diameter was obtained. This plate was bolted to the face-plate of the lathe by means of three 1in. studs, or distance pieces, of sufficient length to admit the cylinder casting being placed between the two. A hole was then bored in the boiler plate to fit the spigot end of the cylinder, and the latter was then bolted in position. The arrangement is clearly shown in the photograph (fig. 1). A boring tool of the ordinary type was used, made as stout as the tool holder would accommodate—that is, 1in. square steel. It was necessary to take light cuts for the sake of ease in driving the lathe by foot power, also to avoid springing and chattering of the tool. After boring, the cylinder was lapped out by means of a wooden lap, somewhat smaller than the bore and covered with emery cloth well lubricated with oil.

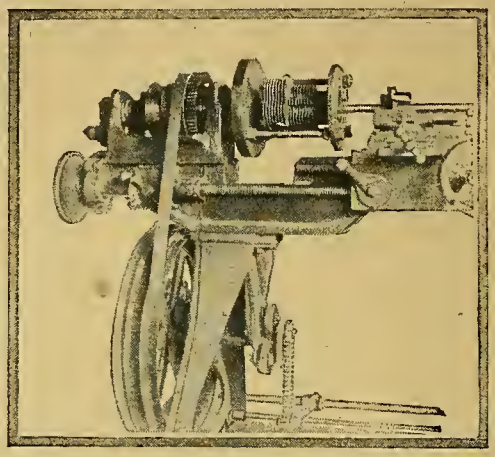


Fig. 1.—Method of fixing the ½in. boiler plate to the face plate of the lathe.

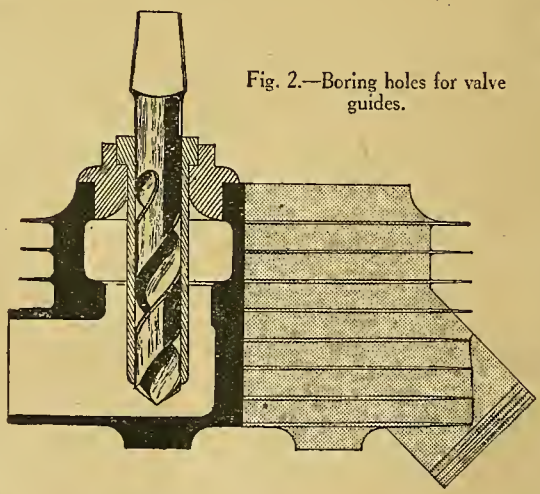


Fig. 2.—Boring holes for valve guides.

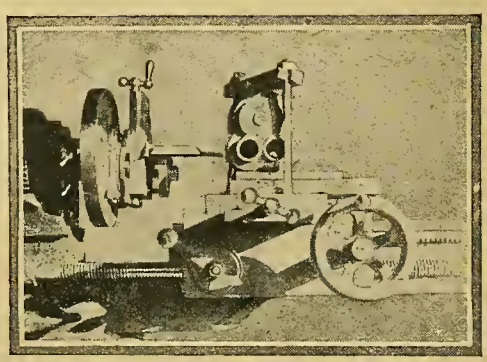


Fig. 3.—Machining the inlet and exhaust connections.

Machining the Valve Seatings.

Next the valve chambers were marked out to coincide with the measurements of the old cylinder; a circle was scribed on each valve chamber face to facilitate setting up on the face-plate, which was accomplished by bolting the previously-mentioned boiler plate, together with the cylinder, directly to the face-plate in the reverse position to that adopted for boring. Having machined the valve seats and screwed the chambers to receive the valve caps, it was necessary to make a guide for the twist drill used in boring the bottoms of the valve chambers to receive the guides. This was done by screwing a guide into the inlet valve cap in the position of the sparking plug. Fig. 2 shows the arrangement with the twist drill in position for boring.

For the turning, boring, and screwing of the carburetter and exhaust pipe connections, the slide rest was removed and the cylinder bolted down on the saddle of the lathe, the slide rest being mounted on the face-plate of the lathe, and the shanks of the tools were bent at right angles to enable the work to be done. Fig. 3 clearly shows the arrangement, and it made quite a first-class job.

The cylinder bore was intentionally left a shade under size, and a very light cut was taken off the piston to true it up to fit the cylinder. The skirt of the piston was reduced to clear the cylinder walls to eliminate friction. Since carrying out the above repair I have ridden over a hundred miles with the new cylinder, and find it a great improvement on my old one, which had a cracked valve seat.

The whole of the work was carried out on a 5½in. centre screwcutting treadle lathe at a cost of under 10s.

W. P. WALKER, A.M.I.Mech.E.

Occasional Comments by "Ixion"

Front Brake Details.

ANYBODY who has acted as a judge in the "condition" examination at the finish of a reliability trial knows that the loss of front brake shoes is one of the commonest grounds for a penalty; and anybody who has ridden as many makes of motor cycle as I have knows that the front brake is the most inveterate source of annoying rattles. They commonly arise at two points. The first is at the bearings in which the tips of the steel horseshoe ride, these bearings being fixed to the forks. The second is between the down rod to the horseshoe and the steering head; a swivel is usually inserted in this rod to cope with any change of alignment as the shoes bed into the rim, and on many machines the only precaution taken to prevent the rod rattling against the steering head is a clearance; the rod is set out, say, half an inch from the head, and the maker is sanguine enough to suppose that it will not sway enough to foul the tube. As its only bearing is usually close to the handle-bar, it usually sways more than half an inch at the bottom, and you have to wrap insulating tape round the lower part of the head to stop the noise. I have just been trying two 1917 machines of good make, and both of them suffered from these two irritating defects. Other makers have eliminated them, and they should both be conspicuous by their absence from all 1917 designs.

More Conversions to the All-chain Drive.

IT is now notorious that the end of the war will reveal many more conversions to the all-chain drive, including some notable firms. The meaning of the change can perhaps be understood if I mention that the Douglas remains recalcitrant, and retains its well-tried chain-cum-belt transmission. In the 2¾ h.p. Douglas we have a machine of which low weight has always been a special attraction, and which is not intended for sidecar work, though some enthusiasts do not hesitate to burden it with the double load. The Douglas retention of the belt as an item in the drive possibly may be interpreted as follows: "The belt is perfectly satisfactory for solo work; if we adopted the all-chain drive, we should have to strengthen the frame, and to incorporate one or two anti-shock devices, which would add totally unnecessary weight." I will not be so foolish as to regret the disappearance of the belt from one or two of my old favourites until I have tried their all-chain models. But, personally, I had no quarrel with the drive which these firms are scrapping; if I had been a sidecar enthusiast, I might have viewed the change more complacently. As it is, I must submit with my best grace to seeing the chain adjustments complicated, and the weight slightly increased, for the sake of those numerous riders who indulge in sidecar work with a 500 c.c. engine. And I ought to admit that the chain-cum-belt drive is just perceptibly snatchy on single-cylinders at slow speeds, whereas a properly cushioned chain drive is absolutely shockless on a good twin. No doubt it will be equally smooth on the new singles, though my experience of all-chain singles in the past has hardly suggested such possibilities.

"Some" Bicycle.

HOW many readers noticed "Excelsior's" assertion in our issue of February 1st to the effect that his Villiers two-stroke could "easily climb" Sunrising on a gear of 5¼ to 1? I have not owned a Villiers engine; but I have never owned a baby two-stroke which would look at a hill of that calibre on its top gear. As the correspondent mentions several other fairly steep hills in the same connection, I presume there is no slip of the pen. Do other readers make similar claims? I have just discovered a new merit in the babies. There has now been practically continuous frost since December 1st, and when the weather was mild for a day or two I had no leisure to tackle the decarbonisation and tuning jobs for which each member of my stud was sighing. As my garage is unheated, I have waited two months for a day on which spanners would not give me frost-bite, and the other day I caused a great fire to be lighted in the drawing-room, laid brown paper all over the carpet, stalked into the garage, tucked my baby two-stroke under my arm, carried it into the drawing-room, and decarbonised it there very comfortably without exciting Mrs. "Ixion" to do more than threaten an offensive.

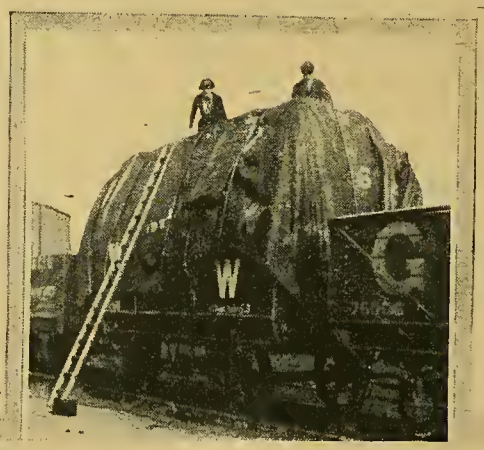
Springs and Mudguards.

I CONFESS to being a little surprised that the Government has not placed larger orders for spring frame machines. In my experience they vastly reduce the frequency of petty troubles and permit of hard riding with a minimum of fatigue, two benefits which ought to outweigh any conceivable objections. However, nothing short of complete inside information on the expense and dislocation of the factories involved could justify dogmatism on this point. As to mudguards, wherever there is thick traffic travelling over liquid slime you have to clean your attire daily, not because your own mount is a mud flinger, but because other traffic flips it sideways all over you. For these reasons the perfectly mud-guarded machine is something of a delusion, except for dwellers in the country. I personally choose the line of least resistance in these matters; I don an oilskin or other waterproof suit, and turn the hose on it at the journey's end. If I rode exclusively in the country or in small towns, I might set a higher value on idealism in mudguards; as it is, I frankly prefer more sightly fittings and more get-at-able tyres. It is further true that the latest machines, with compromise mudguards and a pair of footboards (instead of rests), bring one home moderately clean. After twenty miles over rural roads on one of them one is not dirtier than if one had ridden a similar distance over London's suburban arteries.

War Work and Lady Motor Cyclists

Further examples of the usefulness of the Motor Cycle in Womens – National Services.

THE war has developed latent qualities among the women of England, no matter what their station in life may be. From the highest to the lowest all are "doing their bit" with an amazing cheerfulness and with an ability and energy which surprises those who had regarded the women of this country as frivolous and pleasure loving. In the hospitals, in the factories, on the farms and market gardens, women are now to be seen doing work which in previous days was regarded as essentially men's portion, and doing it cheerfully and well. The prejudice against female labour is gradually being overcome, and those who have employed women are loud in their praise of the capacity they show, and the tireless devotion to duty which they exhibit. The means of reaching their centres of work present many difficulties to some, particularly those who live in the country. The train and tram services usually suffice for town hands, but those working in the country, where housing accommodation is so limited, find a bicycle almost indispensable. Happier still are those who possess motor cycles, for they can undertake duties releasing men for the Army which those less fortunately situated cannot accept.



(Top) Superintending the sheeting of a load of hay
(Bottom) Transports passing through Cirencester

Women's Adaptability.

Two Gloucestershire ladies, who previous to the war lived in happy surroundings at home with no business cares to worry them, have undertaken work which a few years ago would have been regarded as absolutely outside the scope of woman. They are Miss Maude Stephens and Miss M. C. Parker, both motor cyclists, and both are now holding responsible positions as Government forwarding supervisors of forage supplies.

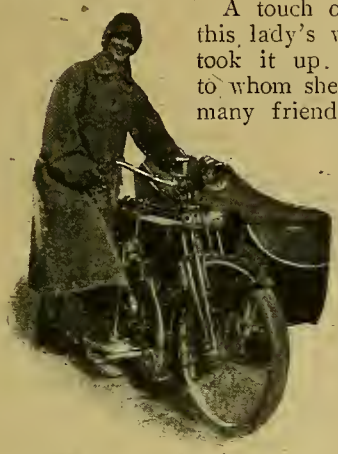
Miss Stephens's duties are varied and onerous, but she thoroughly delights in them. Those who have no knowledge of the work of this department would be astonished at the amount of forage which has to be supplied to the troops. Motor lorries and horse waggons are continually plying between the various farms and railway stations, and the supervisor has to see that all works smoothly, and that the requisite amount of hay and straw is consigned to the proper destination. Visits to the baler, which is constantly being moved from farm to farm, have to be made regularly, and from the farms journeys have to be taken to the various stations in the vicinity to check and weigh the bales. This accomplished, the superintendent returns to the office and supplies the consignee with full particulars as to weight, numbers, etc., and the name of the farmer from whom the consignment comes.

From this description it will be seen that Miss Stephens's days are fully occupied, and without a motor bicycle she would find it absolutely impossible to get through the work. Miss Stephens rides a 2¾ h.p. Douglas week in and week out, in all weathers, and usually she returns to her rooms at night healthily tired, but with the satisfying feeling that another good day's work has been accomplished in her country's cause.

So far, Miss Stephens has had no difficulty in getting sufficient

War Work and Lady Motor Cyclists.—

petrol, and has not had to make use of any substitutes.



Miss M C. Parker in her winter rigout.

A touch of romance is added to this lady's war work, for since she took it up she has met an officer to whom she is now affianced. Her many friends wish her the best of luck, and their kind thoughts will follow her to her new home in South Africa after the war.

Miss Parker has control of the Stonehouse district, and her work is in every respect similar to that of Miss Stephens. In addition, however, Miss Parker has two Government stores, one holding 500 tons of hay, and the other 400, to look after. At present she has two motor transports with four men on each, and sixteen soldiers in the stores under her control. To accomplish her work she rides a 3½ h.p. standard Sunbeam, of which she speaks most highly. Being a capable mechanic, she is able to repair ordinary mishaps herself, but during the dark days of last autumn she experienced an alarming side-slip, which, fortunately, did not result in anything serious. On the "safety first" principle, however, she now runs with a sidecar when the roads are greasy or snowy, for, no matter what the weather, the work has to be done.

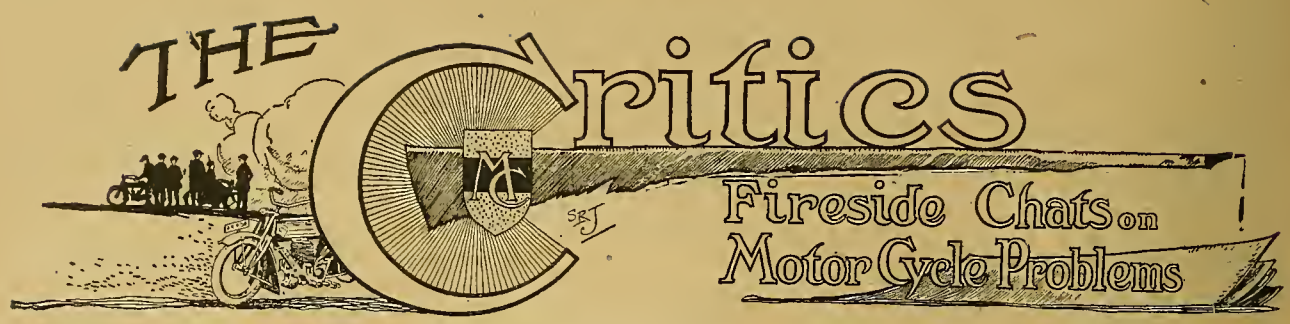
Miss Maud Stephens on her Douglas.

Here we have two instances of how the girls of England are doing their bit, and both Miss Stephens and Miss Parker are thoroughly enjoying the experience. The fact that they are doing really valuable work is sufficient compensation for them both, but, in addition, the life is a healthy one, and the continual motoring about the country in the fresh air has given them that ruddy appearance which only accompanies perfect health.

M. HARTLEY-SMITH.

A SCOTTISH PANORAMA.

An advantage the road user has over the traveller by trains is the enjoyment of magnificent panoramas. In these days of speed gears and efficient engines the steepest hill does not alarm the motor cyclist—indeed, hills only add to the zest of a run. The above picture is of the Clyde from Kirkfieldbank Hill. Those who know the Yorkshire coast may be struck by the similarity, on first glance, of the view of Whitby from the heights inland.



"YOU say a modern motor cycle is perfect? For the life of me I cannot understand why British manufacturers have refused so long to fit mechanical oil pumps." The observation was by a Journalist, with a complacency of criticism inspired by the possession of the only comfortable chair in his room. "As for mechanical pumps," the Novice remarked, "I don't even know where they put the things! It takes me all my time to keep my old jigger running as it is, and I couldn't adjust a pump even if I had one. What's the matter with a pumpful every ten miles? It's easy to remember."

Little Adjustment Required.

"If there is one thing that needs to be left severely alone," retorted the Journalist, "it is a mechanical oiling device. But there is no reason why it should give you any more trouble than a drip feed—the other way round, in fact! Its working doesn't depend on your memory, and all you have to do is to give the feed valve one-half or one-quarter turn, according to the temperature, when you set out. The thing looks after itself."

"Do you speak from a journalistic point of view, or from practical experience?" demanded the Manufacturer with an air of truculent defence.

"From experience. The fact that my last three machines were all fitted with mechanical feed is sufficient proof. Indeed, that point influenced my choice more than anything else."

"And haven't you experienced any trouble?" asked the Novice, regarding the Journalist with the wondering admiration Henry VIII. might have bestowed upon a monogamist and teetotaler.

"Absolutely none! On cold mornings you have to turn on a little more oil, but that is a simple matter. The common notion that a mechanical pump means extra care is absurd."

"I have heard it said," put in the D.R. impressively, "that no mechanical device can govern a steam engine like a human governor. I rather fancy the same applies in governing the supply of oil to a petrol engine."

But the Journalist was obdurate. "An engine driver is a trained man," he pointed out. "Motor cycle manufacturers cannot cater for trained men. They have to think of the juggins." All three looked rudely at the Novice, who busily brushed his waistcoat—a nervous habit he had acquired owing to its protruding expanse being particularly prone to collect tobacco ash. "He has to strike a delicate compromise between mechanical perfection and bedrock simplicity," added the Journalist.

The Opposite Opinion.

"Which is exactly why he hesitates in adopting mechanical oil feed," stated the Manufacturer. "You talk about adjusting the supply to suit the temperature, but that is not the only point to be considered. The natural density of the oil used is equally important. In your case the system happens to prove good, because you keep your drum of oil at home, and fill up every time with the same brand. Other men—particularly the novice—fill up anywhere, at any time, and with any grade of oil that happens to come handy. Just imagine the absolute beginner re-adjusting his pump to suit all these various conditions when the slightest misjudgment may mean a dry engine."

"You cannot depend on the absolute beginner to do anything, except to let the clutch in—with a bang," the Journalist pronounced. "The advantages of the mechanical pump feed system are obvious to the rider of normal intellect. In the first place, it feeds the oil in a proper flow to the points where it is most needed, instead of leaving the flywheels to slop it about haphazard."

WHAT IS IT?

At first glance one might well ask. The picture shows the curious effect produced by an amateur photographer who attempted to snap a motor cyclist in mid air.

"True," agreed the Manufacturer. "Still the problem is a knotty one. First, there is the question of price; then, do you know that a certain manufacturer nearly lost his reputation by fitting a pump to feed oil slowly to the engine—so slowly, indeed, that it nearly stopped, and the big end bearings gave out?"

"That is no argument," the Journalist retorted. "There was once a flying man who lost his life trying to fly, but the machine he invented is to-day one of the best above ground! Because one pioneer made a mess of it, are the rest going to fight shy instead of wading in? My Aunt Matilda got stung by a jelly fish when wading up to her ankles to avoid jelly fishes. If she had waded in up to her knees like the Americans on the same shore, she probably would not have been stung at all!"

The Novice suggested that that was one in the eye for the Manufacturer, and that jelly fishes constituted a dainty only the rich could indulge in. Then the D.R. relieved the tension of the moment by stating his views, which usually came from any point of the compass that happened to suit him.

Invisible or Visible Feed.

"I think," said the D.R., "that the defect in present mechanical systems is that the feed is not visible to the rider. That, really, is the fly in the ointment. The man on the machine should be able to see the feed and to adjust it from his seat."

At this point the Novice had something to say about waterproof covers for seats, but the ex-soldier waved him silent.

"This, of course, means complications in the way of pipes," the D.R. proceeded, "and the further the oil has to flow the more its density will govern the speed at which it flows. Still, I think the sight feed is worth a lot, as if one cannot see the flow of oil one always suspects the pump of malingering when the engine refuses to pull."

"There may be something in *that*," the Manufacturer agreed. "If the adjustment were on the tank and the flow visible one could then govern the supply to meet the extra demand of a head wind or a very long gradient. Fancy having to get off and turn off the oil when descending a mountain, as one has to in present day systems! The supply of oil to the engine *must* be governed by haud, no matter how it is fed."

"If you read the motoring journals," stated the Journalist, "you would know that the latest productions *are* governed by hand, and yet are entirely mechanical. The supply is determined by the throttle,

The Critics.—

opening, which is undoubtedly the right system."

The Manufacturer grinned. "Very nice on paper," he mumbled, "which is the chief point with you journalists. But we manufacturers have to consider absolute reliability when the good name of our engines depends upon it."

What Constitutes Reliability?

"In my opinion," replied the Journalist, "if you can lend your machine to a friend, and know that it will be properly lubricated, whether he rides it five or seventy miles, that is the true test of reliability."

"What could be simpler than telling your friend to push the plunger down every five or six miles?" demanded the Manufacturer. "That is all you have to do with the ordinary hand feed."

"Nothing could be simpler," replied the Journalist, "except having to tell him nothing at all—as in the case of the mechanical pump."

The D.R. and the Novice chuckled audibly. From the security of the couch shadows the Journalist's dog growled at the Manufacturer, and, all things considered, popular feeling was against him.

The D.R. prepared to deliver the *coup de grâce*.

"The ordinary rider can't judge five or six miles," the Discharged Soldier pointed out, characteristically plastic in his views. "He pushes down the plunger every two or every sixteen miles, as he happens to think of it. He does not even make sure that the pump draws its full charge, nor does he realise, in changing machines, that no two pumps draw a like amount. The overall result is that his engine is either over-alled or under-alled!"

"You mean," suggested the Journalist, "that either he under-oils, or his over-alls are all over oil through over-oiling?"

"That's it," the D.R. agreed. "Generally he over-oils to be on the safe side, and since the manufactnrer does not have to pay his oil bill or decarbonise his engine, he rather likes it. He prefers it to the risk of under-oiling by mechanical pump. He can hold the owner responsible for under-oiling and worn bearings so long as the feed is hand governed, but immediately we have mechanical pumps, which the manufacturer himself designs and sets, worn bearings will be at his own door-step."

"I consider it is easier perpetually to over-oil with a pump than with the alleged hit and miss principle," stated the Manufacturer. "And why, in big races, are the machines equipped with mechanical pumps invariably equipped with a hand pump in addition? It looks rather as though they were not very confident in their system, doesn't it?"

The Journalist shrugged his shoulders.

"As regards the argument," the Novice added, "it seems to me that any sort of lubrication is good so long as delivered in judicious doses."

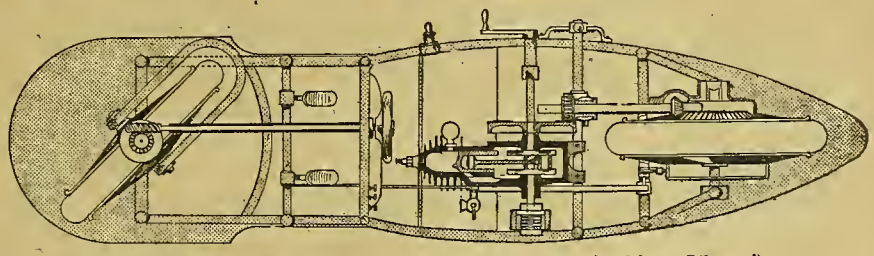
At this juncture the Journalist's landlady retired noisily to bed, asking her tenant if he would kindly put the hall light out. Ere the night was through, in that automatic way that arguments have of switching round, the Manufacturer was talking in favour of mechanical feeds from the private owner's point of view, while the Journalist was arguing hand pumps from the Manufacturer's standpoint—which seemed to indicate that both were open to conviction—till, on the door-step, the D.R., with kindly enquiries after Aunt Matilda, was the last to depart.

Then the Journalist put out the dog, and left the hall light burning, and, trudging to bed, he felt some of the joy of a great and single-handed achievement.

A CAR TYPE SOLO MOUNT.

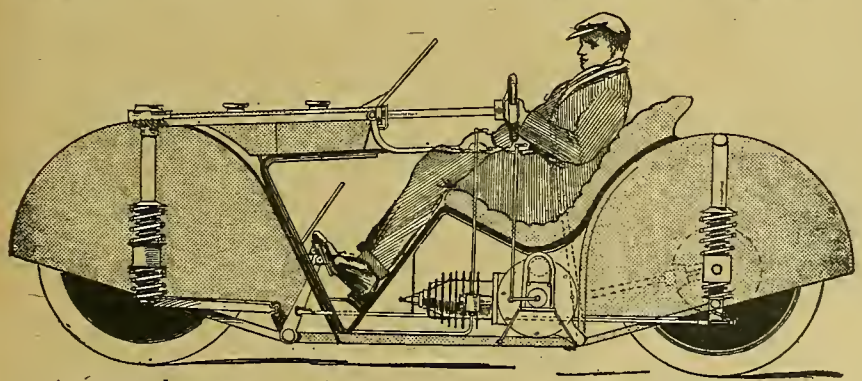
An Original Attempt to Evolve a Weatherproof Motor Cycle.

MANY efforts have been made to evolve a truly wind and weatherproof motor cycle, but so far the solo mount on car lines, having the luxuries of a cushion seat, wheel steering, and windscreen, has failed to win the appreciation of the somewhat sceptical solo rider. From time to time we have regaled our readers with the efforts of amateur genius in productions of this kind, and the accompanying illustrations convey some idea as to what might be accomplished. True car comforts would be appreciated by many a solo rider, but, unfortunately, there are other things just as dear to him. He is troubled, for instance, by a subtle forehoding that some day, sooner or later, he is sure to come off, and he is obsessed by the desire to do it in the open air, rather than in the restricted space of a weatherproof body.



The designer gives this vehicle the quaint appellation of "Motor Bikecar."

In spite of the sense of profound luxury which the accompanying illustrations convey, the machine would appear to possess one or two minor defects which have evidently escaped the eye of its inventor. Front wheel side-slips may confidently be expected, the arrangement of the front wheel steering being on car lines instead of on motor cycle lines.



A car type solo mount—a reader's serious attempt to solve the problem of weatherproofing the motor cycle.

The Fly-open Door.

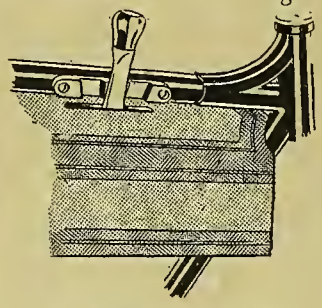
We are informed that "fly-open" spring doors are to be fitted at either side, so that on bringing the machine to a standstill the driver can thrust out one leg, and thus support himself and the machine. We shudder to think what would happen if he thrust out the wrong leg, or the door refused to open at the critical moment!

The framework being 50% heavier than a standard frame, the inventor proposes reducing the weight of the power unit in order to compensate for this—an ingenious solution which, we fear, would not meet with the approval of the speed merchant. But then, of course, the inventor is not out to catch the eye of the speed man, and those to whom this type of machine would appeal most strongly are willing to sacrifice a good deal for comfort and shelter. In this case we have, as further compensations, the luxury of a friction gear, giving an infinite range of speeds forward and reverse, a shaft drive, telescopic wheel steering, and a special shape of combustion head, which in itself is as original and curious as is the whole design of the machine.

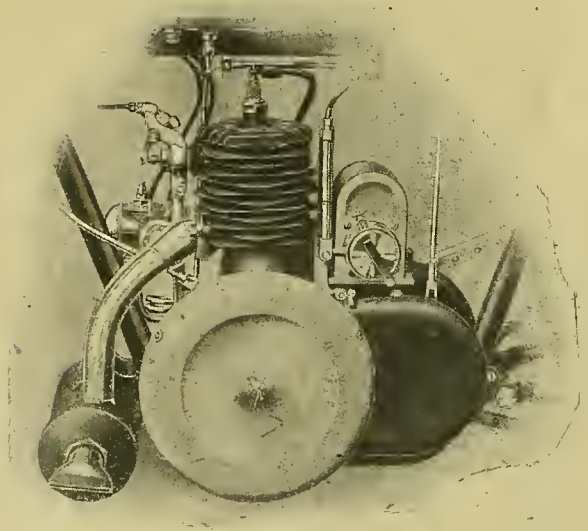
TWO WINTERS ON A JAMES TWO-STROKE.

The Advantages and Limitations of a Baby Lightweight.

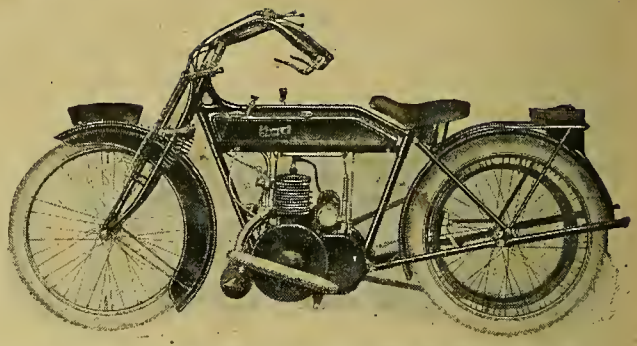
THE baby two-stroke is in some senses a tantalising machine. It is infinitely lighter than most motor cycles, and therefore specially adapted for odds and ends of trips. Few people regard it as the ideal mount for long non-stop runs, but it is deliciously convenient for all short spins, and especially so for a round of calls necessitating frequent stops. Nothing compares with it for such purposes except the baby four-stroke; and the baby four-stroke is far more vibratory, and has a less pleasing exhaust, besides being more difficult to re-tune after a spell of hard work. Furthermore, the baby four-stroke is very apt to "dry up," or otherwise complain if driven hard, whereas a well-run-in two-stroke revels in full throttle work, provided one can get a sparking plug which will stand the racket. On the other hand, a baby two-stroke needs very precise handling, and therefore does not give of its best until you have mastered your sample, and learnt its special whims; if, for example, you are reckless and haphazard in your oiling methods, you will get a lot of four-stroking, you will soot the plug with annoying frequency, you will carbonise the top ring hard into its groove in a very few miles, and you will have to spend the usual forty-five minutes in decarbonising it much too often. Finally, baby two-strokes vary exceedingly in quality. For all these reasons one hears varied reports of these wee machines.



The gear control lever passes through the tank.



The power unit of the James two-stroke. The engine has a capacity of 64 × 70, equalling 226 c.c. Observe the staggered ribs, a distinguishing feature of the James engine.



The 2¼ h.p. James has a two-speed countershaft gear, the primary drive being by an enclosed chain on either side of the crank case and thence by belt.

But the simple truth is that if a good machine is bought and intelligently handled it cannot be beaten for runabout purposes, whether as the only mount in the stable or as a tender to a bigger machine reserved for long distance work. To my mind, its suitability for long distance work is confined to very cold weather, in which pace is uncomfortable, or to elderly and timid riders who are contented with comparatively low speeds.

A Satisfactory Mount.

For the past two winters I have owned a 2¼ h.p. James two-stroke, which has done really hard work over very bad roads with real faithfulness. It was driven very gingerly for 500 miles, until the engine had settled down, and ever since it has been rattled about without sparing, and has not resented the treatment. It is substantially constructed, and none of its details ever gave me any trouble, apart from the occasional loss of a nut or a screw, when I was careless in going over the twiddly bits after fast work on bad roads; one is apt to neglect a general purpose hack. The rigidity of its frame, the excellence of the front fork, and the balance of the engine made it far more comfortable to sit than most babies are. It has proved a glutton for work. It always started in a yard or two from the stable door, except when damp on one occasion affected the magneto bellcrank. On taking the road it was usually opened up to the fastest pace of which circumstances permitted, and no part of it other than the sparking plug ever resented five miles on two-thirds throttle; after such a spin it would feel a little weak in top gear work uphill, but would instantly recover if the low gear were thrown in. On its low gear it is perfectly capable of climbing grades of 1 in 6, even when it is very hot. The special two-stroke plugs made by the Lodge and Sphinx people suit it well, but I got the best results from Lodge racing plugs after I had mastered its lubrication. I do not recommend these plugs until the oiling is correct, as they are not designed to burn oil off their points, and are none too easily cleaned if accidentally sooted. As I normally drove my machine very hard, the usual petrol consumption did not work out at much better than 60 m.p.g., though on several occasions I got 80 m.p.g. in pottering work at a speed rarely above the legal limit.

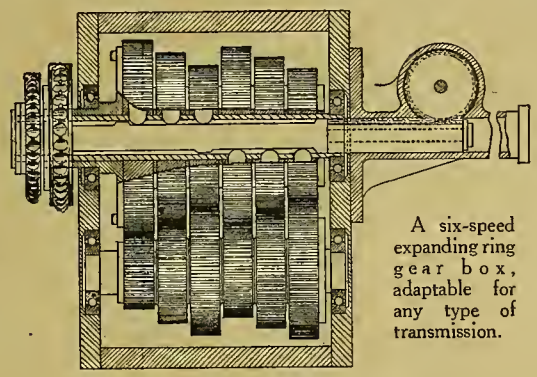
Two Winters on a James Two-stroke.—

With petroil lubrication carburetter flooding is apt to make the fuel consumption artificially high, unless oil is carefully filtered; small impurities in the oil lodge in the needle valve seating and prevent the needle from closing. Given a suitable sparking plug, the running of the little James is hard to beat. In the matter of design, I can only name two points for consideration. The transmission is undoubtedly unusually simple and efficient, but it is the reverse of accessible, and owners would be well advised to content themselves with removing the cylinder when tuning up; if they attempt to take the engine completely down they will regret their temerity. The other defect is almost universal on two-strokes. The head of the cylinder comes so near the middle tube of the frame that there is only comfortable clearance for a midget sparking plug. Beyond question two-stroke engines benefit from the use of big, well-cooled plugs, and especially from the addition of such patent plug radiators as the Fletcher. With greater clearance, the use of such plugs and accessories would be easier. It must, however, be granted that the middle frame tube is missing from many lightweights, and many such frames are insufficiently rigid for strength and comfort. IXION.

EXPANDING RING GEAR.

THE gear box here illustrated is the patent of Mr. Edward Davies, Queen Anne's Chambers, S.W., and represents an attempt to carry into practice an expanding ring friction gear giving more than two speeds. The pinion wheels on the primary shaft each contains an expanding ring clutch, the operation of the rings being by a central rod, free to slide horizontally, and having two cams, by which engagement and disengagement are effected.

The general principle of the gear is shown in the inventor's drawing, which represents the device in its extreme form, giving six speeds.



A six-speed expanding ring gear box, adaptable for any type of transmission.

In a modified form the device might be adaptable to motor cycle use, and, if brought within reasonable limits as regards weight and size, would undoubtedly prove a very pleasant gear to handle.

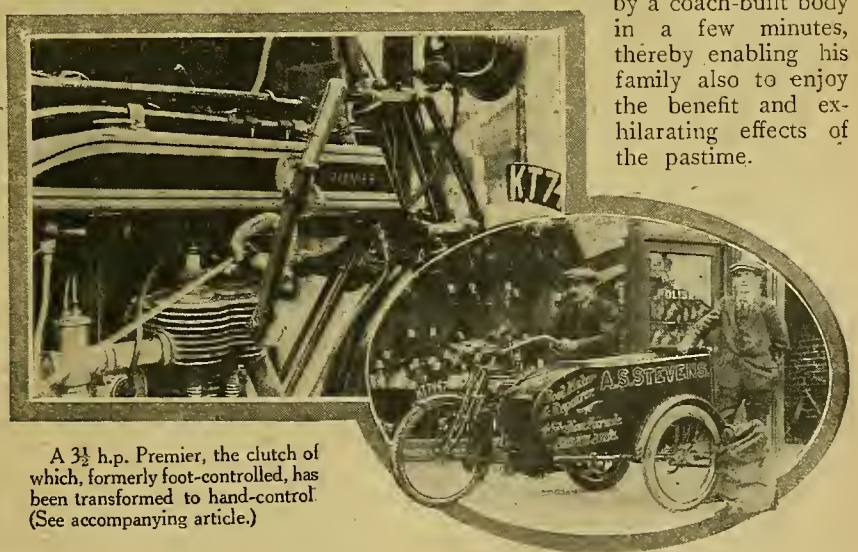
The method of operating the clutches appears to be the only point suggesting possible novelty. It will be observed that the cams come into operation alternatively, thus reducing the necessary movement of the actuating rod. The less movement on this rod, indeed, the better, for some leverage would be required to overcome the friction on the cam faces. The drawing is purely diagrammatic.

MOTOR CYCLES FOR THE LAME.

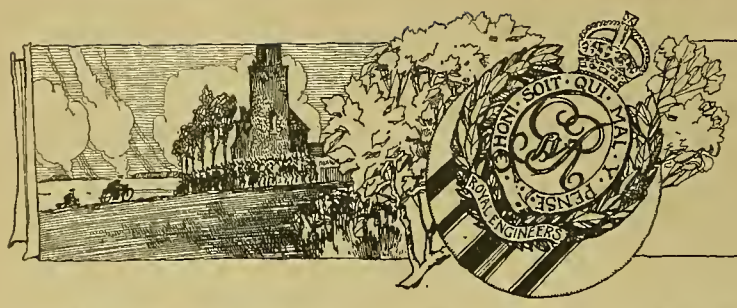
WE have many times commented on the possibility of motor cycle and sidecar driving for lame riders. There are, unfortunately, many who will be prevented from participating in the pastime in its more strenuous forms when peace arrives, but those who have received severe injury need not lose hope of ever again enjoying the pleasures of driving a motor cycle. Many devices are being evolved whereby full and complete control of the sidecar will be possible even by a one-armed man, the matter being still simpler if only one leg be lame or lost.

We have received from Mr. Arthur S. Stevens a letter in which he states that he had at one time never thought to have the pleasure of riding a motor cycle, being lame in his right leg, but to-day he can ride and drive anywhere, and is able to use his machine for business purposes. The machine originally had the usual foot clutch control, but Mr. Stevens has now arranged for control by hand, as will be seen from the photograph. The control is handily situated on the off side of the machine, attached to the tank tube, and is of substantial size—an advantage in that a gradual engagement is possible.

Mr. Stevens has arranged the trade box carrier so that it can be taken off the chassis and replaced by a coach-built body in a few minutes, thereby enabling his family also to enjoy the benefit and exhilarating effects of the pastime.



A 3½ h.p. Premier, the clutch of which, formerly foot-controlled, has been transformed to hand-control. (See accompanying article.)



MILITARY NOTES.

Notes from the Various Fronts. "The Motor Cycle's" 11,264 Recruiting Applications.

OVERSEAS SINCE 1914.

W SPENCER PERCIVAL, formerly connected with the London depot of Humber, Ltd., who was an official observer in the last A.C.U. Six Days Trials, and won a double journey gold medal in the London-Edinburgh-London run, has been in France with the British Red Cross service since October, 1914, and is now making application for a transfer as a despatch rider.

MOTOR CYCLIST AS WORKSHOP OFFICER.

LT. REGINALD G. PARKER, A.S.C., M.T., formerly of St. Ives, Hunts, was married last week, at Bridlington, to Miss Evelyn May Simpson. Lt. Parker will be remembered by readers as a competitor in the Paris-Nice trial, and figured in other contests. He will return to his workshop company in France after the honeymoon.

TRADE AFTER THE WAR.

AN A.S.C. officer on the West Front, formerly connected with the motor trade in the Midlands, in the course of a letter to us, remarks:

"All the boys here read *The Motor Cycle*, and I can tell you we appreciate it immensely, and especially your efforts to help the trade out for business *après la guerre*. Believe me, there will be a few of us looking for good jobs with fat screws attached when this job is over, but goodness only knows how many of us will get them. Anyhow, we shall just have to 'wait and see,' to quote an ancient and rotten policy."

ADVENTURES OF THE M.C.C. SECRETARY.

WRITING from Alexandria Hospital, Maitland, Cape Town, to the Editor of this journal, Col.-Sgt. Southcomb May, former secretary of the Motor Cycling Club, says:

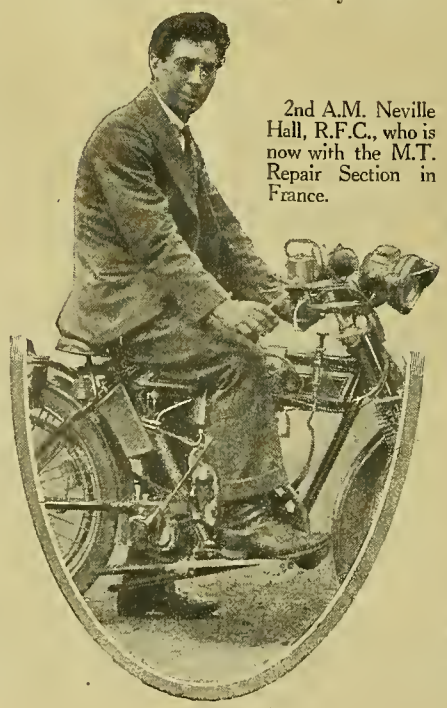
"It is very hard to get any news of what is happening in G.E.A. out here, but apparently my chums of the Gold Coast Regiment are still not far from where I left them. We had a pretty easy time on the march down as far as the Wami River, and generally had a grass shelter to sleep under, though I very frequently slept outside in preference. The men run these shelters up very quickly, and they vary in elaborateness. We only had one wet night, and, of course, on that occasion for some reason or other we were shelterless with the exception of a ground sheet. The next day we had a rainproof shelter built, and, of course, it did not rain. The following day we moved on about eight miles, and my company were camped on top of a hill with about a 1 in 2 gradient. After that we took to the mountains until we finally bumped into the Germans. I got through nearly 3,000 rounds with my Vickers gun, and that was after a march of 200 miles without seeing a shot fired."

It should be added that Mr. Southcomb May, though recruited for the M.M.G.S., answered with five others a call for volunteers for the Gold Coast, as at that time he saw no immediate prospect of Overseas service with the M.M.G. All were accepted, and a few weeks later landed at Mombasa, calling at Cape Town and Durban, and thus seeing something of South Africa on the way.

A LIGHTWEIGHT EXPONENT IN FRANCE.

WE have received from France a most interesting letter from Neville Hall, who will be recalled as an exponent of the O.K. lightweight machine, his most notable performance being in the gruelling Six Days Trials of 1914. His was the only miniature to finish, and the other competitors were so impressed by his plucky exhibition that a petition was signed to present him with a special gold medal. Hall has served two years in the R.A.M.C. and eighteen months in France. For some time past he has been anxious for a transfer, and wrote us on the subject many months ago. He is now in the Royal Flying Corps as a second-class air mechanic, in which section he naturally feels more at home by reason of his great interest in motor vehicles, and particularly his ability to extract the utmost efficiency from small engines. He is at present a fitter in a M.T. Repair Section. Hall says:

"It is good to get back to the old game again. Our division had been through most of the Somme dust from July 1st right up to Thiepval, which we took on September 26th. It was there that I first saw the Tanks and also got in the way of a bit of Boche H.E. Luckily only a slight wound, in fact I did not even get to the base. Two Christmases over here is just a bit too much for anyone unless he is an absolute glutton. The sergeant in our shop is Sydney George, of Indians, and we had Capt. A. Mackenzie Cott, once owner of Big Ben, over us for a fortnight."



2nd A.M. Neville Hall, R.F.C., who is now with the M.T. Repair Section in France.

"THE MOTOR CYCLE'S" WAR WORK.

SINCE the beginning of September last, at which time the Editor of *The Motor Cycle* ceased to recruit direct for Army motor cyclists and car drivers, 659 letters applying for advice with regard to enlisting in the various specialised sections of the Services have been received and dealt with. In many instances men have been examined technically and a certificate issued at the special request of the recruiting authorities. The applications mentioned bring the total number of enquiries on recruiting subjects received since the war began to 11,264.

SPECIAL BADGE FOR TANK OPERATORS.

AN Army Order states that a special badge has been approved for the *personnel* of the Machine Gun Corps, Heavy Branch ("Tanks").

The badge will be worn on the right upper sleeve of the service dress jacket by all ranks. In the case of non-commissioned officers who wear chevrons above the elbow it will be worn immediately above the chevrons. Approval has also been given for the introduction of new badges for First Class Lewis and Hotchkiss gunners.

ILLNESS AND THE SEVERE WINTER.

WE much regret to record that L.-Cpl. W. I. McGhie, a well-known Coventry journalist, who joined the Machine Gun Corps, Heavy Branch ("Tanks") last June, died last week in a French hospital after suffering from bronchitis and asthma.

ONE OF THE ORIGINAL D.R's.

LT. RALPH MANSFIELD, nephew of Lord Sandhurst, who was married at Sheringham on Thursday last, volunteered at the start of the war as a despatch rider, and did excellent work. He has since received a commission in the Royal Engineers.

MENTIONED IN DESPATCHES.

LAST Thursday's *Gazette* contained the following names of motor cyclists mentioned in despatches in General Smuts's report of the East African campaign :

South African Motor Cycle Corps.—Lt.-Col. J. McI. Fairweather, D.S.O., Lt. H. E. Jackson, Temp. Lt. H. A. E. Hall, Sgt. J. Coles, and Sgt. H. W. Watts.

South African Motor Despatch Riders' Company.—Cpl. J. Kloppert, Cyclist W. Israel, Sgt. F. S. Johnstone, Cyclist P. Smith, Cyclist S. Gibbins, Cyclist D. Stewart, Cyclist L. C. Ratcliff, Sgt. J. J. Smith, and Sgt. C. D. Bulman.

THE TANKS ON THE FILM.

CORRESPONDENTS report great enthusiasm in the provinces where the official film of the Tanks is shown. There is quite a hubbub of excitement when the Tanks are announced, and there is no doubt that they have struck the popular imagination. The men who operate them are regarded as heroes, and quite rightly, too. Many who have seen the films were surprised to observe that the men in the Tanks wear leather helmets very similar to those used by racing motor cyclists. The helmets are, of course, to prevent the occupants of the Tanks bumping their heads on projecting machinery inside the Tank when traversing rough ground. There is comparatively small space available inside a Tank.

At the picture house the writer attended a member of the audience was overheard explaining to a companion how the word "Tank" originated. "The Government started to make these Tanks at the outbreak of war," so he affirmed, "and to put inquisitive people off the scent they were described as 'Water Tanks.' The ruse was quite successful," the youthful informant added. As a matter of fact the incident reminds us that the men of the Tanks had an "official" trick played upon them during their training at the secret camps. So that the intentions of the Army authorities should not become known, the first batch of Tanks had clearly emblazoned upon their sides different Russian names, which at once, perhaps naturally, gave rise to the rumour that they were intended for operations on the Russian front. More than one recruit whispered to us that Russia was whither he was bound.

MOTOR CYCLIST D.R.'s OF THE TANKS.

Severe weather is being experienced in France, but throughout our doughty men must "carry on." The photograph, depicting very wintry conditions, was sent to us by Gr. G. Pattison (left) and Gr. Brown (right), both despatch riders of the H.B., M.G.C.—the Tanks

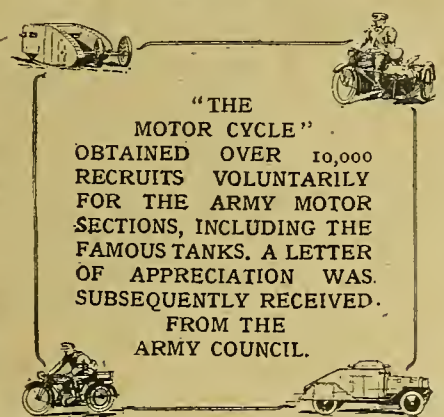
A SIDECAR COMBINATION WANTED.

THE Church Army is urgently in need of a good motor cycle and sidecar for organising work in connection with the C.A. Flying Squadrons. In the *Church Army Review* the Editor writes to the effect that such a gift would "be an excellent opportunity of putting to good use a machine disused, temporarily or permanently, on account of petrol restrictions." Any kindly response will be most gratefully received by Capt. Carter, 56, Bryanston Street, London.

A TRIALS RIDER ON MILITARY MACHINES.

A LEADING trials rider at the Front comments as follows as the result of extended experience with the machines allotted to him :

"When will makers of all military machines realise that two speeds are not enough, and that a handle-bar controlled clutch is a necessity? Half an inch clearance between tyres and guard is not enough by inches, and, again, the front rim brake is worse than useless out here. It should be remembered that in the war zones motor vehicles get the maximum of riding with the minimum of attention, and, all things considered, they stick it wonderfully. It is the little things that worry one, not so much radical faults in design."


"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

FORMER HUMBER TRIALS RIDER.

A. G. FENN, whom we last heard of in Egypt, is at present in a Midland convalescent home for officers suffering from a bad attack of rheumatism in the feet.

Average Prices of Second-hand Machines.

WE give below the average prices of second-hand models offered for sale in *The Motor Cycle*. Difficulty in obtaining a sufficient number of one particular model often arises, owing to the fact that many advertisers omit some of the most essential details.

Make.	Year.	H.P.	Average for last week.	Latest weekly average obtainable.
A.B.C.	1914	3½ T.T. 3-sp. s/car	£70	—
A.J.S.	1916	6 3-sp. sidecar	—	£90
„	1914	6 3-sp. sidecar	£63	—
„	1915	4 3-speed	£58	—
„	1914	2¾ 3-speed	£40	—
„	1915	2¾ 3-speed	—	£47
„	1916	2¾ 3-speed	£55	—
Allon	1916	2-stroke, 2-sp.	—	£36
Ariel	1916	5 3-sp. sidecar	—	£76
„	1914	5-6 3-sp. sidecar	£48	—
Bat	1913	8 2-sp.	—	£39
Bradbury	1914	4 2-sp. sidecar	£50	—
„	1913	3½ 2-sp. sidecar	£35	—
B.S.A.	1916	Model K.	£51	—
„	1915	4½ 3-sp. sidecar	£58	—
Calthorpe	1916	4 2-sp. sidecar	£55	—
„	1916	2¾ 2-speed	—	£28
Clyno	1914	6 3-speed	£65	—
„	1914	2½ 2-stroke	£27	—
Connaught	1914	2½ 2-stroke, 3-sp.	£21	—
Douglas	1916	2¾ 3-speed	£55	—
„	1915	2¾ T.T.	£44	—
„	1914	2¾ T.T.	£31	—
„	1913	2¾ T.T.	£29	—
„	1914	4 2-sp. sidecar	—	£60
Enfield	1916	6 combination	£83	—
„	1916	3 2-speed	—	£48
Excelsior(Am)	1916	7 3-sp. sidecar	£69	—
H.-Davidson	1916	combination	£85	—
Humber	1915	3½ 3-speed	£58	—
Indian	1916	5 T.T.	£57	—
„	1916	Powerplus 7 comb.	£80	—
Ivy	1915	2-stroke	£24	—
James	1914	3½ twin, 3-sp.	£36	—
Levis	1915	2½ 2-speed	£30	—
Matchless	1915	8 3-sp. sidecar	—	£80
New Hudson	1915	4 3-speed	£50	—
„	1916	2½ 2-sp. 2-str.	£38	—
New Imperial	1916	2¾ 2-speed	£35	—
Norton	1916	3½ T.T.	£45	—
P. & M.	1914	sidecar	£55	—
„	1912	sidecar	£32	—
Precision	1914	8 3-sp. sidecar	£47	—
Premier	1915	3½ 3-sp. sidecar	£45	—
Rover	1915	3½ 3-speed	£38	—
„	1914	3½ T.T.	£25	—
Rudge	1915	3½ 3-sp. sidecar	£49	—
„	1915	Multi sidecar 5-6	£45	—
Scott	1916	sidecar	—	£58
„	1914	sidecar	—	£40
Sunbeam	1916	8 sidecar	—	£100
„	1915	8 sidecar	£90	—
„	1916	3½ 3-speed	£75	—
„	1915	3½ 3-sp. sidecar	£85	—
Triumph	1916	4 3-sp. sidecar	—	£70
„	1915	4 3-sp. sidecar	—	£60
„	1914	4 3 speed	£40	—
Velocette	1915	2½ 2 str., 2-sp.	£24	—
Zenith	1916	4-5 Gradua	£50	—
„	1915	5 Gradua	—	£49
„	1914	8 Gradua sidecar	—	£42

Current Chat

Time to Light Lamps

GREENWICH TIME.

Feb. 15th	...	...	5.42 p.m.
,, 17th	...	...	5.45 ,,
,, 19th	...	...	5.49 ,,
,, 21st	...	...	5.53 ,,

Special Features

WAR WORK AND LADY MOTOR CYCLISTS.

MACHINING A CYLINDER.

TWO WINTERS ON A TWO-STROKE LIGHTWEIGHT.

The Royal Automobile Club.

It has been officially announced that the Royal Automobile Club, instead of being requisitioned as a Government office, will be allowed to continue as a club for Overseas officers.

To Develop British Petroleum.

To develop new sources of petroleum found in the British Isles, Sir Boverton Redwood is taking charge of a research section for the Ministry of Munitions. Sir Boverton Redwood is petroleum expert to the Government, and has long been associated with the R.A.C. Technical Committee. Sir Boverton stipulates that he will not accept remuneration for his services.

Few Second-hand Machines in France.

A French reader seeking our advice on the purchase of a second-hand motor cycle mentions that he has been offered in Paris a 1914 T.T. B.S.A. with three-speed gear box at £64, a 1913-14 T.T. B.S.A. with single gear £56, T.T. Douglas with three-speed gear box £72, and a Manx Rudge 1913-14 model £80. These prices give some idea of the high figures that the few British second-hand motor cycles available in France now command.

Youthful Genius.

Regularly drawings of motor cycles are sent us by proud parents as examples of the budding genius of their small sons. We certainly do not wish to discourage amateur efforts, but the circumstances are rather reminiscent of the unfortunate artist who, having lost both arms, continued to paint with his feet. Admittedly his pictures were good, considering he had done them with his feet, but the question arose, Why do them at all?

More Road Manglers.

The Local Government Board has recently issued an Order that "the driving wheels of an agricultural locomotive which are shod with diagonal cross-bars may, while the locomotive is being used on frost-bound roads, be provided with studs."

This amendment of the Act is, of course, owing to the long cold snap, the condition of the roads in many districts being such that the greatest difficulty has been experienced in moving heavy locomotives owing to wheel slip.

The Practical Motor Cyclist.

We hear of three motor cyclists who have evolved special types of aeroplane engines so promising in design that they are being considered by the Army and Navy experts. It has often been remarked with real truth that the motor cycle is the finest schooling a motor engineer can receive.

Adapting Zeppelin Practice.

In December last our contemporary *The Automobile Engineer* published a full description of the power unit used for the propulsion of Zeppelins, and a reader now suggests that the system employed on these engines for cooling the lubricating oil, the big end bearings, and indeed the whole interior of the crank case, might advantageously be adapted to motor cycle engines. On the Zeppelins a ventilating cowl, facing the direction the airship is travelling, scoops air into a big manifold, from which pipe connections convey the cooling blast to the crank case bearings. The air is drawn out by a second manifold, which increases in diameter as it extends towards the rear, where it terminates in a similar ventilating cowl facing backwards. The greater the air resistance the greater the load on the engines, while the strength of the cooling draught increases, of course, proportionately, yet we fear that the system could not successfully be applied to motor cycle engines on account of the dust in the atmosphere so near the road. The oily interior of the crank case would indeed have a tendency thoroughly to filter the air.

Interest in Motor-assisted Bicycles.

Our illustrated description of the Simplex motor unit for attachment to pedal cycles has created great interest, judging from the enquiries which have followed the publication of the article.

A 'Varsity despatch rider of a Douglas motor cycle attached to Headquarter Staff scribbling a message in which a French poilu is interested. The scene is quite near the firing line in France.

The National War Funds.

At the week-end the principal war funds stood as follow :

The Prince of Wales's Fund (distributed £3,529,719)	£6,030,105	0	0
British Red Cross Fund	6,135,022	0	0
Tobacco Fund	125,290	0	0

No Petrol—No Licence Needed.

In view of the possible petrol position in the spring, *The Motor Cycle* urges that the authorities cannot justifiably retain the whole of the 1917 licence fees paid during the month of January.

The Balance of V Twin Engines.

A letter published from Mr. Osborne de Lissa, of the M.A.G. Engine Co., contains the statement that the company has on test an M.A.G. engine, a V twin of 45°, which is so well balanced that at 3,000 revolutions it will run without being bolted down to a bed. This is a test which, we believe, only flat twins have hitherto succeeded in passing.

The Refund of Licence Fees.

An authority in the motor world, to whom we suggested that motorists were entitled to a refund of a proportion of the licence fees paid, replied that he did not consider that the Treasury would consider such a rebate because—*(a)* There is no knowledge as to the period for which petrol licences will be non-renewable, and the restriction may be removed in three months. *(b)* It would be too much trouble to check whether a man had a just claim for supplies.

The Motor Cycle not a Dangerous Vehicle.

According to Rochester, N.Y., there were 1,054 accidents caused by vehicles of all types during 1916, of which 906 were slight and 48 fatal. Of those that did not result fatally, 454, or more than 50%, were caused by automobiles; almost one half of the fatal accidents—21 out of 48—were also caused by motor cars. Next to the motor car the tramcar was the chief offender, there having been ten fatalities and 154 lesser accidents due to the tram. Horses and horse-drawn vehicles caused the deaths of five persons and injuries to 84. There were all told 84 motor cycle accidents, considerably less than 10% of the total, and of these only one resulted fatally.

Imports and Exports.

Instead of a blank, or at least a very insignificant total, against the amount of imports of motor cycles for January, we have the remarkable sum of £16,218. It was understood that imports of motor cycles were to be prohibited from last March, yet the imports during January were *more* than those in January of 1915, before prohibition was spoken of. This is a remarkable state of affairs. We exported 872 motor cycles last month, to the value of £45,454. The value of parts, however, is greatly in excess of the January, 1916, figures, being £33,676 against £31,602.

The January exports of motor cycles and parts for the last three years are as follow :

1915.	1916.	1917.
£45,696	£70,065	£79,130

PETROL IMPORTS.

There has been a huge increase in the quantity of petrol imported over the previous January's amount. Figures :

Jan., 1915.	Jan., 1916.	Jan., 1917.
Gals.	Gals.	Gals.
6,984,339	6,985,279	13,001,740

9,000,000 gallons more petrol were imported during January, 1917, than in December, 1916. No doubt the difference is accounted for by the sailings of the tank ships being uncertain.

Duty has been paid on 8,986,719 gallons during the month ended January, 1917. It may be of interest to know that 18,483,000 gallons of petroleum and other lamp oils were imported during last month.

Substitute for Petrol.

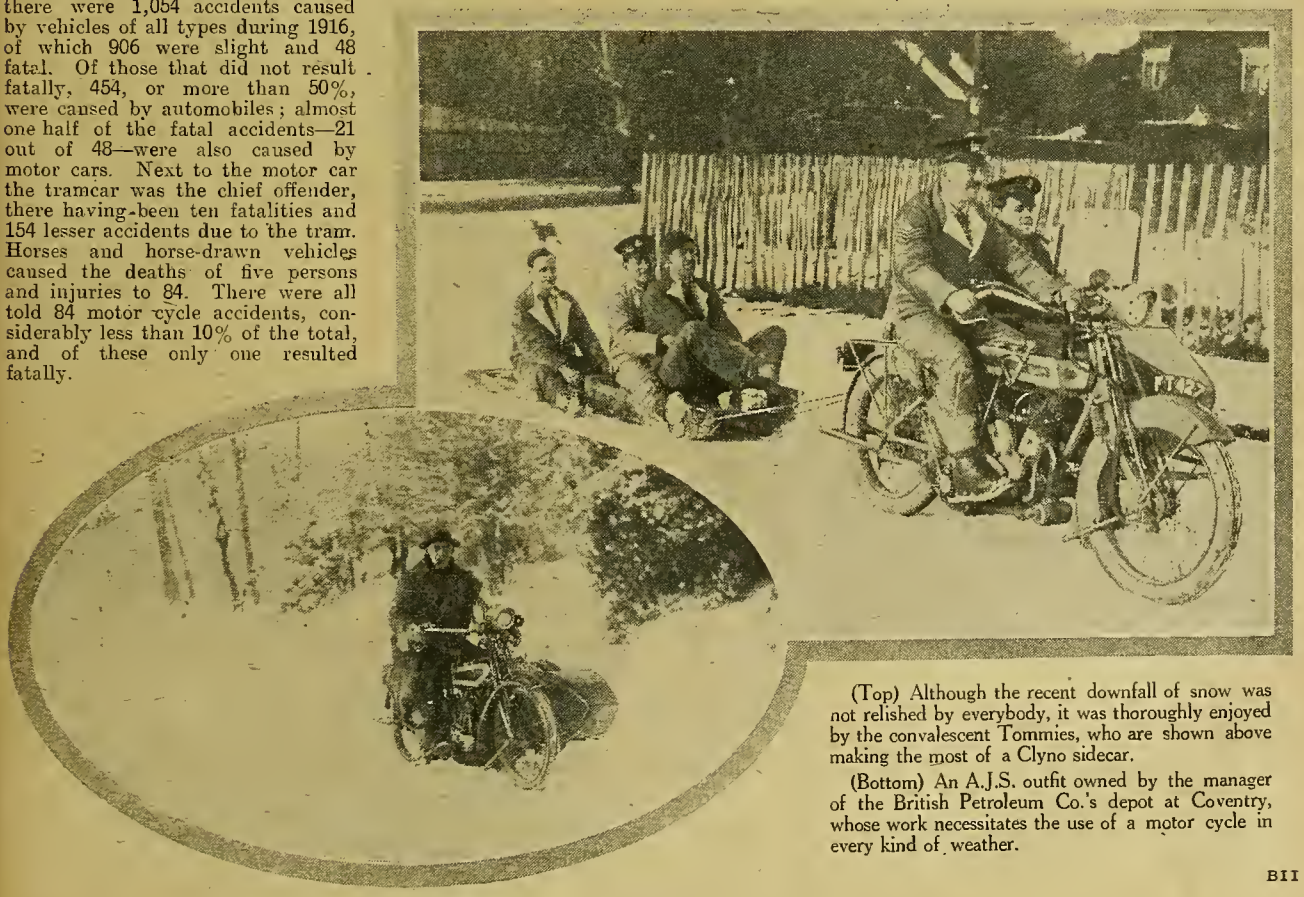
The latest substitute is Vaporine, handled by Mr. Hugh Gibson, the famous sidecar driver, who was formerly with the Clyno Engineering Co.

Petrol for National Workers.

It is gratifying to know that motor volunteer sections and motor ambulance corps supply petrol to their members, and a motor cyclist who is doing work of this kind can feel, while he is enjoying his favourite pastime, that he is doing some good for his country. In this connection we may mention that the National Motor Volunteers, Room 5, The Polytechnic, Regent Street, London, W., are seeking the assistance of quite a number of motor cyclists, of which they are very short, so here, at least, is one opportunity of which Metropolitan riders may take advantage.

Mail and "The Motor Cycle" Adrift.

It is quite conceivable that letters from Overseas readers intended for *The Motor Cycle* may not in all cases reach their destination, on account of the activity of submarines, the Hun knowing no law, even passenger ships carrying mails being sunk without warning. For the same reason, copies of *The Motor Cycle* posted to subscribers abroad may, in some instances, fail to reach their destination. The publishers of *The Motor Cycle* give notice that, as far as possible, they will endeavour to replace any copies lost if application be made reasonably early, mentioning date of the missing issue.



(Top) Although the recent downfall of snow was not relished by everybody, it was thoroughly enjoyed by the convalescent Tommies, who are shown above making the most of a Clyno sidecar.

(Bottom) An A.J.S. outfit owned by the manager of the British Petroleum Co.'s depot at Coventry, whose work necessitates the use of a motor cycle in every kind of weather.

THE VICTORY LOAN.

Subscriptions of the Motor and Allied Trades to the War Loan.

	Total. £	New Money. £
A.A. & M.U.	77,000	—
Alldays & Onions	21,000	21,000
Bluemel Bros., Ltd.	40,000	35,000
Bradbury & Co., Ltd.	10,000	10,000
J. B. Brooks & Co., Ltd.	25,000	10,000
B.S.A. Co., Ltd. & Daimler Co., Ltd., jointly	500,000	430,000
Calcott Bros., Ltd.	10,000	10,000
Calthorpe Motor Co.	30,000	10,000
Coventry Chain Co., Ltd.	25,000	25,000
Coventry Repetition Co., Ltd.	10,000	10,000
Coventry Aluminium and Refining Co.	500	500
Douglas Bros.	200,000	200,000
Dunlop Rubber Co., Ltd.	350,000	350,000
Employees of Siddeley-Deasy Motor Car Co., Ltd.	10,000	10,000
Enfield Cycle Co., Ltd.	20,000	5,000
Heath's Garage, Ltd.	5,000	5,000
Lanchester Motor Co.	5,000	5,000
Lodge Sparking Plug Co.	25,000	20,000
Joseph Lucas, Ltd.	25,000	15,000
Mr. Percy Martin	10,000	10,000
Middlemore & Lamplugh	15,000	5,000
Morgan Motor Co., Ltd.	20,000	3,500
J. Pedley & Sons, Ltd.	5,000	5,000
Charles H. Pugh, Ltd.	30,000	20,000
Mr. C. Vernon Pugh (Chairman, Rudge-Whitworth, Ltd.)	6,000	6,000
Rudge-Whitworth, Ltd.	50,000	50,000
Joseph Sankey & Sons	25,000	25,000
Thos. Smith's Stamping Works, Ltd.	36,000	10,000
Triumph Cycle Co., Ltd.	53,000	10,000
Warland Dual Rim Co.	8,000	3,000

PETROL - PARAFFIN MIXTURES.

A Method of eking out Petrol Supplies.

THE writer is one who studies economy wherever possible. In view of the shortage of petrol I turned my attention to paraffin as a substitute, and my experiences may interest other motor cyclists.

I am a rider of a 3½ h.p. of well-known make, which at present is rather difficult to obtain owing, I think, to the demand of the War Office, etc. It has horizontally-opposed cylinders, two speeds and clutch, is fitted with a coachbuilt sidecar, and after eighteen months' usage, and covering about 3,000 miles, it is still an ever-ready mount.

Experiments with Paraffin.

I have always used petrol alone until 1916. At the beginning of last year I took the engine down, and was surprised to find scarcely any carbon deposit on the top of the pistons and cylinder heads, and that the rings were as free as ever they were. This I thought might possibly be due to my having the magneto fairly well advanced, say about a half or two-thirds, therefore giving a clean explosion, though this, of course, would slightly increase the heat of the engine. When petrol became expensive I considered the use of petroleum. I started experiments on a twenty-mile run with fairly steep hills, but found, with a mixture of one-third petroleum to two-thirds petrol, that to get up speed was more difficult, especially after slowing down in top gear and then trying to pick up again; also that popping and back-firing in the carburetter occurred fairly often, and that blowing out through the air inlet was quite a black smoke, which gave me the opinion that my engine was getting more carbon deposit than with petrol only.

110 Miles on 1½ Gallons.

Still out for economy, I had another trial. This time I made a mixture of one quart petroleum to one gallon of petrol, and filled my tank, which holds one and a half gallons, and then took a run, with my wife and child in sidecar, over the Mendip Hills from Bristol to Castle Cary. This is twenty-eight miles direct from our city *viâ* Pensford, but the road I took was *viâ* Keynsham, Hallatrow, and Shepton Mallet, which increases the distance about four miles or so. On my return journey I went through Bruton, which is three miles from Castle Cary, making the total distance about sixty-five miles. The running of my machine was certainly quite even and there really seemed to be more power, and I could take full air at good speeds, just the same as with petrol.

Later we took a spare tin of petrol mixture, but did not refill the tank, as I was anxious to see what mileage could be done, and set out for Cheddar *viâ* Burrington Coombe, taking the end of the Mendips again. The engine travelled splendidly all the way, taking hills quite easily. We returned through Axbridge and Langford, over the noted Red Hill, which is long, steep, and with plenty of ruts, running down the steepest part of it. Then we turned from the main Bridgwater Road and went through Brockley Coombe, returning home by the lower road. The ride was very exciting, as we expected to run our tank dry every minute; but we finally arrived home without replenishing the tank, though it was practically drained dry. This trip was about forty-five miles, and with the previous run makes about 110 miles on one and a half gallons, an average of well over seventy miles to the gallon, and only going in bottom gear about twice on each journey. This with a coachbuilt sidecar, with wife and child as passengers, say about 10 stone, and myself 10 stone, I consider good, and is a much higher mileage than I have done before. The cost of this mixture works out at about 2s. 4d. a gallon, a saving of 5d. a gallon against No. 2 petrol—not a great margin, but it is a consideration to those of limited means. The weekly saving, however, will pay the storage bill, which is something at any rate.

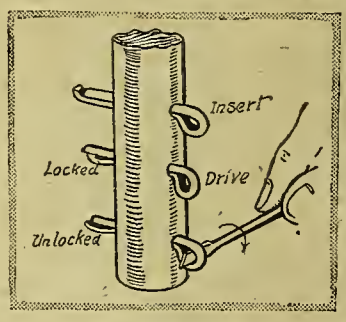
My mount has given every satisfaction, and up till now has only needed the attention of myself. I am no mechanic, and have only the knowledge that I have gained chiefly by reading *The Motor Cycle*. I have taken most of the steepest hills round about Bristol, such as Dundry, Rownham, Red Hill, etc. My machine romps up all of them, and I cannot say that I long for a heavy combination. What I cannot master on top gear I can easily accomplish with the bottom, though on long hills that are rather steep a third gear would be a great advantage, as it would mean that the hill could be climbed more quickly.

C. T. HILL.

[*The use of substitutes has been exhaustively dealt with in "The Motor Cycle" by helpful articles, and subsequently by readers who have related their actual experiences, and described the design of vaporisers used.*—ED.]

THE HAMMERLOCK SELF-SPRINGING COTTER PIN.

MESSRS. BROWN BROTHERS, LTD., 15, Newman Street, London, W., have lately introduced the Hammerlock self-springing cotter pin, the points of which are tapered quite close together, so that the cotter pin may be pushed straight through the hole intended. To lock it it should be hammered on the head until the points are of equal length; then it is necessary partially to flatten out the eye, and force the shorter or straight branch forward, so that its end will ride up over the upturned point of the other branch, thus automatically separating as well as locking the point rigidly into place. To remove the cotter the point of a screwdriver, the tang of a file, key, or any thin tool should be inserted in the eye and twisted in the direction indicated by the arrow so as to return the short shank to its original position. When this has been done the cotter pin can be removed with the aid of the fingers.



A self-springing cotter pin of novel design.

The Petrol Control Committee regret to announce that they are no longer able to consider applications for the renewal of *existing* full-duty motor spirit licences for private motor cars and motor cycles, unless the holder of the licence is engaged upon work of national importance and the continued use of a motor car or motor cycle is essential for such work.

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—With reference to this subject, having driven various cars and motor cycles for a period of over ten years, and being partially deaf, I consider that I am qualified to make a statement on the matter.

I note that your reader, Mr. Hitchcock, asserts that only the sound of a horn can, in many cases, avert an accident. This I can understand when a cart or pedestrian is concerned, but in the case of two motor cycles or cars his idea is absurd. Has he never read of any motor accidents in which both parties swear that they blew their horns, but neither heard each other? in fact, such a case occurred quite recently, in which the judge stated that he considered it to be very difficult to hear another car when travelling in one's own.

I find that the majority of motor cyclists seem quite unable to hear an overtaking car or motor cycle until it is practically on top of them, regardless of any amount of horn-blowing. This is easily explained by the noise of their own engine and the rushing of wind past their ears.

Your correspondent's fear of runaway horses I can only characterise as sheer piffle; certainly I have never met with one in my lengthy road experience, and, in fact, have never been inconvenienced by my defect.

In conclusion, it is rather a good thing for Mr. Hitchcock that his three tests of a driver are not carried out before granting licences, for after reading the whole of his letter one is forced to think that he would certainly fail on the third.

R. VERNON ESNOUF,
Manager, The Cardiff Motor School.

Sir,—The action of the Northamptonshire Licences Committee seems based on an old and popular contention that because a man cannot see or hear he is a danger and a nuisance when using the roads. This is the theoretical conclusion, and would not be borne out by facts.

I am stone deaf myself, and I have cycled for years and motored for five years, with cars as well as motor cycles, without danger to myself or to others, by day and by night, and often on the byways of the country, where hardly two cars could pass.

The deaf motorist cultivates his other faculties, is extremely cautious, and the possessor of an acute mind. Above all he obeys the rule of the road.

If all motorists used the roads as the deaf man does there would be fewer accidents. It seems the usual habit of many motorists to take corners wide as long as no warning is heard.

JOHN OSWIN.

[Many letters, voicing the same sentiments on this subject, have been unavoidably held over owing to want of space. —ED.]

Sir,—"M.C.S." sees no reason why he, who has only one eye, should be considered an incompetent driver. Perhaps he is unable to see this, because he has only one eye. I have two and can see a very good reason, viz., persons with only one eye cannot judge distances. I have only been in one collision between vehicles, and in that instance the driver of the other vehicle had only one eye, and misjudged his distance from me.

It is, of course, a great misfortune for "M.C.S.," but that is no reason why he, and other persons similarly afflicted, should be allowed to be a danger to themselves and to other road users, vehicular and pedestrian.

A. L. GRAY.

HEATING THE INDUCTION PIPE.

Sir,—(1.) "Ixion" states that the *longer* the induction pipe the better the carburation as regards power, acceleration, and economy—three real good points. In the latter part of his remarks on this subject he states that the single-cylinder engine would not show a *less* efficiency if the inlet pipe were a foot long if heated. The essential point to me is, would the single-cylinder with a properly heated *long* induction pipe show *more* efficiency?

(2.) Heating the induction pipe: Will Mr. John Hawes be kind enough to state how the *ends* of his copper jacket were sweated. Probably to the induction pipe. A small sketch would be of great assistance. I wish to try this (Mr. Hawes's) method, as a saving of twenty miles to the gallon is worth cultivating.

(3.) "Heating the Carburetter," by M.A., LL.B., M.B. This gives a very clear sketch of the heating system, but the result, being the same as without the hot air supply, puts me in the same position as the Novice in "The Critics."

I shall feel obliged both to "Ixion" and Mr. Hawes for any assistance they will kindly give.

OLIVER.

Canonbury, N.

STARTING ON ACETYLENE.

Sir,—We note the letter written by Mr. F. C. Lees, which appeared in your number of the 1st inst.

We do not wish to use strong language, but we think it really necessary to point out that this letter from Mr. Lees is of so extraordinarily inaccurate a nature that we are really at a loss to know what object Mr. Lees had in writing it, unless his statements were due to sheer ignorance.

He infers that anybody using acetylene in an internal combustion engine is liable to a fatal accident, and he also infers that fatal accidents have been caused by using acetylene in this manner.

Can he point out one single fatal accident due to this cause?

As a matter of fact, acetylene behaves in an internal combustion motor in exactly the same way as a mixture of petrol vapour and air or of coal gas and air. The only difference is that the calorific value of acetylene is higher; in other words, more air is required and less gas. It seems to us that a very superficial knowledge indeed is necessary to reduce the proportion of acetylene.

Can Mr. Lees produce one single instance of the top of a cylinder having been blown off through using acetylene? It is possible that an isolated case may occur—although there is not one in our records—but, on the other hand, we can produce hundreds of cases where acetylene has been used successfully for years for running gas engines, for instance, at country houses.

The most astounding statement of Mr. Lees is, however, that the making of a mixture of oxygen and acetylene is prohibited by law. This shows the extent of Mr. Lees's knowledge, and it may interest him to know that there is not a Government dockyard, nor a munitions factory of any importance, where oxygen and acetylene are not mixed together on a very large scale for the purpose of welding.

There is not a Dreadnought or other vessel of war, or mercantile steamer, or aeroplane, or torpedo built to-day without the aid of the oxy-acetylene blowpipe, which works with a mixture of acetylene and oxygen.

The final paragraph of Mr. Lees's letter, "I would not on any consideration allow acetylene to be used in any case

where I might be able to prevent it," shows the value of his opinion, or of his experience, seeing that his opinion is directly opposed to that of every scientist of note in the kingdom.

For THE BRITISH ACETYLENE AND WELDING ASSOCIATION,
R. G. LUCAS, Secretary.

Sir,—With reference to broken connecting rods and cylinder heads, I have seen and heard of numerous cases when using petrol. I might say that while scanning the morning paper recently I read of a man and boy being killed through petrol vapour becoming ignited; so much for petrol. Now, if the tank of the car in question had been filled with paraffin and started up with acetylene, this catastrophe would not have happened. With petrol, of course, you carry the high explosive with you wherever you go, and in some instances sit on top of it. Mr. Lees, I think, has made a slight mistake in tackling the danger question. H. G. PASSEY.

CAN THE LIGHT CAR EQUAL THIS?

Sir,—With reference to Mr. J. Horswill's letter in your issue of January 25th *re* his Powerplus Indian combination, if this should catch his eye, I should very much appreciate particulars of the improvements he has made, viz.: Front guard side shields, rear ditto, leg shields, and the extra air slide, as I am at present riding one of these models.

G. A. ROBERTS.

BEARING PRESSURES AND LENGTH OF STROKE.

Sir,—In the recent discussion on bearing pressures with reference to long and short-stroke engines, may I venture to point out that the matter is not one of simple calculation such as your contributors seem to unite in thinking.

During the course of eighteen years' experience in designing various mechanisms, I have had to unlearn many of the conventional ideas regarding stresses and bearing pressures. In all mathematical computations of bearing area that I have come across it has been customary to regard the journals as perfect cylinders which fit the bushes evenly from end to end, due regard being paid to the maintenance of a film of oil between the bearing surfaces.

It surely must be evident to any thinking person that in the average motor cycle crankshaft, supported on two bearings only, and built up of no fewer than five separate main units, the centre line of the crank pin cannot describe a truly cylindrical path. The centre line will usually lie at an angle, however slight, with the axis of the crankshaft in either or both planes. In the first case the figure generated by the crank pin centre line will be the surface of a cone; in the second case it will be a portion of a hyperboloid. This will cause an alternation of pressure between the two end portions of the bearing, theoretically amounting to an infinite pressure at the extreme edge of the bearing if no lubricant were present. The presence of the lubricant acts as a yielding medium between the journal and the bearing, and tends to cause a diminution of the intensity of pressure towards the ends of the bearing.

When under load, owing to the usual overhang of the pulley or driving sprocket, severe bending stresses are induced in the crankshaft, which may alternately increase or diminish the alternating pressures at the ends of the crank pin journal by increasing or diminishing the initial distortion of the crankshaft. As this is the case, I fail to see the object of wrangling over a matter of 15% theoretical difference in crank pin bearing pressures, when the difference in bearing pressure from the centre to the end of the selfsame crank pin may vary well over 200%, depending upon the initial accuracy of the workmanship and the stiffness of the crankshaft. Since the variation in pressure depends on the error in parallelism of the crank pin with the crankshaft expressed as an angle, it follows that the most accurate crankshaft will have the longest bearing life. The accuracy of a built-up crankshaft depends mainly upon the spacing of the holes in the flywheel and their squareness with the same. Consequently, for the same error in spacing a long crank pin will be nearer parallel with the crankshaft than a short one. At the same time, owing to its length there will be more distortion of the crankshaft under load. So that, all things considered, a short stout crank pin is preferable to a long slender one. It seems to me there should be no great difference between the long and short-stroke engines in the respect of actual *not calculated* bearing pressures, and in my own experience I have found very little difference in the bearing life of crank pins of both long and short-stroke engines.

I have in mind a 1911 Bradbury (89 × 89 mm.) engine, which has run up to date over 40,000 miles, and has lately been rebushed for the third time.

A 1912 4¼ h.p. Precision (89 × 96 mm.) up to two and a half years ago had run 18,000 miles in my own hands without rebushing, and is still running with, I believe, the same bearings.

A 1913 Triumph (85×88 mm.) was rebushed three times in 12,000 miles.

A 1913 Norton (82 × 120 mm.) is still running after 30,000 miles, and has been rebushed once.

A 1915 Norton (82 × 120 mm.) in my own hands did 12,800 miles until twelve months ago. Since then it has done a further 8,000 miles, and has only just been rebushed.

My present machine, a 1916 Norton (82×120 mm.), has been running for the last twelve months, and the bearings are practically as good as new.

All the above machines have led a far more strenuous life than might be inferred from the mileages only, since they have been used with sidecar almost solely for gear testing purposes over the hilliest roads and tracks it has been possible to find in the Peak District and the North of England. It will be seen that, as far as the crank pin bearings are concerned, there is practically nothing to choose between them. In the case of the Triumph it is only fair to say that a 3½ h.p. machine had to be constantly over-driven, and even then was not sufficiently powerful to give any definite results in testing gears. The long-stroke machines showed to particular advantage in long stretches of low gear work over abominable surfaces, keeping most wonderfully cool under most trying circumstances. I. COHEN.

SINGLE V. TWIN-CYLINDER ENGINES.

Sir,—I thank your correspondent Mr. F. Mason for his invitation to state the reasons for the abandonment of the V engine in the design of the post-war Matchless, and, while I regret that my time is too fully occupied just now to allow of my entering into a lengthy correspondence on engine design, I will endeavour to give briefly the reasons for the change. It was, in short, to obtain greater refinement in running than can be secured with a V engine. The V engine possesses inherent defects in the lack of balance and unevenness of torque, which, although possible to minimise by careful design and workmanship, cannot be eliminated altogether. As regards power output, this is entirely independent of cylinder position, and there is no reason why a V engine should develop more power than a horizontal twin of the same capacity, or *vice versa*, assuming design in each to be equally correct. I may say that I do not regret my association with the V engine. It was developed during a period when speed, power, and reliability were, generally speaking, the only qualities that appealed to motor cyclists, and refinement of running would not have been appreciated had it been obtainable. The development of the sidecar machine, and the consequent gradual inclusion into the rank of motor cyclists of a class to whom this feature makes a greater appeal, has vastly increased its importance, and I am convinced that the future developments of motor cycle design will be in the direction of providing to a greater degree than before those qualities which can be described as refined running. In answer to your correspondent "A.M.I.E.E." in your issue of February 8th, the defects to which he refers regarding inaccessibility of the magneto, which exist in some horizontal twins, are not found in the model H Matchless, as any part of the magneto can be easily got at if necessary for cleaning or adjustments. I am pleased to note that your correspondent considers the design ahead of its foreign competitors. It has been the earnest endeavour of its designers to achieve that result, and to produce a machine that will regain for its manufacturers the position in the world's market that two years of non-production have lost.

Regarding handle-bar design, this to a great extent is a matter of opinion, but my own, supported by many years of riding experience of all types of machines, is that the long medium width bar as fitted is the best type for sidecar work, while the shorter and wider so-called semi-T.T. is preferable for solo work. Both types of bars will be available when the machine is marketed.

H. A. COLLIER.

LIGHTWEIGHT TRANSMISSION.

Sir,—In your issue of January 25th, Mr. R. Humphreys points out that the 1917 Diamond-Jap fulfils the ideals suggested on the 18th ult. by your contributor "H.M.B." for lightweight transmission, *i.e.*, chain-cum-belt with Enfield two-speed gear. May I point out another machine having this transmission—the Calthorpe-Jap?

For some two months last spring, previous to going to France, I was acting as assistant to a Division officer, R.E., in South Yorkshire. I purchased an early 1915 2½ h.p. model of this make, and found it an excellent mount for running about the countryside in the course of my work. On one occasion I had to make a journey from Doncaster to a village just west of Barnsley and back, as quickly as possible. The little machine made a top gear run there and back, except for a short stretch on one hill on which I was baulked, and averaged 23 m.p.h. without any pushing. The later models have variable ignition, which mine had not, so that climbing will be even better. My mount could do about 40 m.p.h. easily on the level, although I had no time to tune it.

May I congratulate you on the maintenance of the technical interest of your paper which first attracted me some five years ago—"knuttish" articles do not appeal, thanks! "Ixion" and "H.M.B." are two gentlemen to whom I am indebted for many pleasant articles and useful tips.

The "flat twin *v.* the rest" controversy is very interesting. Give me the flat twin for balance—experience will bring flexibility. May your spring frame campaign have the success it deserves *après la guerre*. I served my riding apprenticeship on an old 'bus with a modernised 80×80 Humber engine, fixed gear, and rigid forks—a most sporting old mount, but it taught me how to "nurse" an engine.

At present I am convalescent after a dose of trench fever, and only wish the doctor would allow me to get on to the open road. I must confess my own post-war ideas run more to a Morgan, a Williamson cycle car, or a Scott Sociable for company and comfort.

Another thing I think we shall look for on our bicycles will be throttle-controlled mechanical lubrication, fitted with a pressure "tell-tale" on the tank, as fitted to the dashes of many cars. Usual disclaimer. SAPPER SUB.

East Dulwich.

THE FLAT TWIN AT THE BAR.

Sir,—You have been very kind in publishing my letters on the subject of the "Flat Twin at the Bar." I did not intend writing any further on the matter, but I would just like to have one more word.

I entered this controversy simply owing to Mr. Bradshaw's condemnation of other types of engines except his own. I did not make any personal attack on him or his engine, but I, and many others to my knowledge, became very tired of his constant ridiculing of other people's ideas, and the threats of "rude shocks, etc.," which he was going to provide after the war. He had plenty of time to do this before the war.

Let Mr. Bradshaw make his engines any way he likes, but let him prove them on the track, and then talk if he is successful. It is not sportsmanlike to talk as he does now, when he knows there is no possibility of any racing, but his remarks will not be forgotten when racing is started.

I note with pleasure that Mr. Bradshaw has had a personal test of an M.A.G. engine, and I note his opinion is that it is nothing like as good as the A.B.C. That may be Mr. Bradshaw's idea, but I do not think it is others'.

With regard to the test in which Mr. Bradshaw wishes to put the M.A.G. engine up against one of his own, owing to the import restrictions I am not able to obtain one of the type which he requires, viz., our overhead inlet and exhaust valve racing engine—although I am trying to obtain one.

After the war our works will be able to produce a 45° V engine of perfect balance, but with more efficiency and better power, which the V twin always allows. From tests up to now this engine will run at 3,000 revolutions without being bolted down to a bed. These tests have been made on a 1,000 c.c. engine, and I hope it will prove a pleasant surprise to Mr. Bradshaw and many people who have so many times written in your columns to the effect that it is impossible to balance a V twin, especially a big one.

I read "A.M.I.E.E.'s" letter in a previous issue of your paper, and only wish to reply to this gentleman in consequence of the unfair remarks he makes regarding the manufacturers of the M.A.G. engines. I do, as he understands, represent the M.A.G., and am very proud of the fact that I represent such an excellent firm as are the manufacturers of this engine.

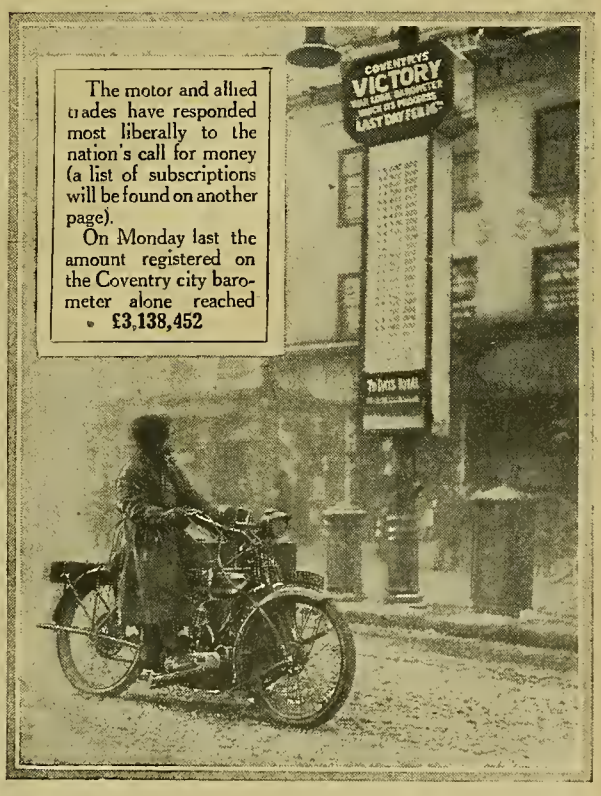
"A.M.I.E.E." cannot be commended for his broad-mindedness to start with, and he must surely realise that "One swallow does not make a summer." He states a firm in Schaffhausen, Switzerland, has delivered 300 motors for German submarines. It might be interesting to this gentleman to know—and I hope it will please him—that the M.A.G. manufacturers in Geneva are high up on the German black list. They manufacture munitions for the Italian, French, Russian, and British Governments. They make an enormous amount of munitions for France, thousands of automobile parts for transport waggons manufactured in this country, and in the next twelve months they have to manufacture a large number of 225 h.p. aero engines of a very renowned type for one of the Entente. They also have a factory in Turin, Italy, which, since the commencement of the war, has been occupied exclusively on munitions for the Italian Army and Navy.

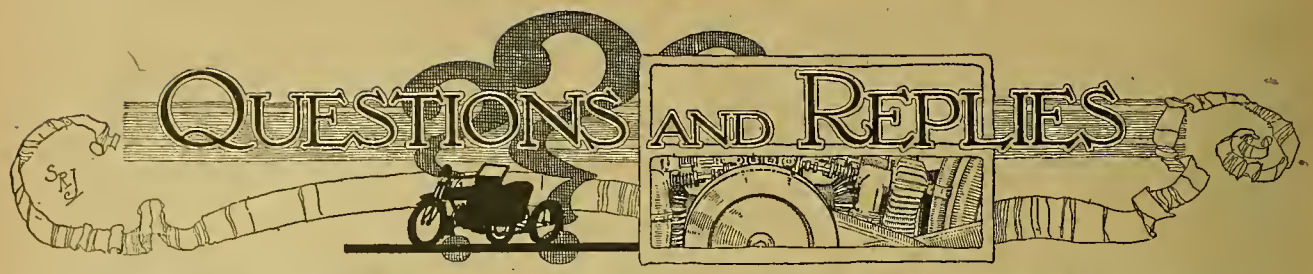
This is all I have to say to "A.M.I.E.E.," who, I notice, was promptly dealt with by "Little John" in the last issue, which I was pleased to see, and I hope it will do him a little good.

I want to thank "Little John" for his kind words in the last issue. I did not intend mentioning the engine of which he writes, but I think it is an engine which will provide even Mr. Bradshaw with a gentle shock for revolutions, balance, power, and absence of heat. This engine has been tested after the finish of a six hours race by wax matches being laid on the tops of the cylinders and in the exhaust valves themselves, and they failed to ignite. This was a 3½ h.p. machine driven by Mr. Le Vack with a passenger in the sidecar. The cylinders were highly polished, and there was no sign of colour on either. It finished third after interminable tyre trouble.

OSBORNE DE LISSA, A.I.M.M.

THE VICTORY LOAN.


The motor and allied trades have responded most liberally to the nation's call for money (a list of subscriptions will be found on another page).
On Monday last the amount registered on the Coventry city barometer alone reached
£3,138,452
COVENTRY'S
VICTORY
LAST DAY FOR LIST



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C., and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Obstructed Petrol Feed.

My machine when started up will go perfectly for about fifty yards, but then suddenly slows down, though it will run fairly well if I close the air. If, however, I open the air again, it will immediately slow down and stop. I lately cleaned out the carburetter, and I think the platinum points are clean. —A.C.

There is probably some foreign matter in the carburetter or jet, as the symptoms lead one to think that the petrol flow is obstructed in some way. Of course, it is possible that the obstruction may be in the petrol pipe or tank.

Using Heavy Fuels.

I shall be greatly obliged if you will give me a little information regarding the use of petrol substitute. I ride a 2¼ h.p. Triumph, and as I am unable to obtain enough petrol to run it as often as I require, I have been considering the advisability of using petrol substitute. I have little or no knowledge regarding the effect on the engine of using any spirit other than petrol, and what I want to know is, would there be any likelihood of my having trouble with the engine if I were to use any of the substitutes sold?—S.A.

A mixture of half petrol and half substitute should not harm your engine. If you use a heavier mixture than this you will have difficulty in starting; indeed, we think that the amount of heavy fuel you can use will be decided by the mixture on which the engine will start. On frosty mornings, after the machine has stood over night, you may find it very difficult to get the engine to fire on the half-and-half mixture, but boiling water poured over the induction pipe will invariably enable an easy start to be made. Ordinarily, an injection of petrol should suffice, and it is a good plan to allow the engine to drain the carburetter when the machine is put away over night. If the fuel is allowed to stand in the carburetter for any length of time the lighter spirits evaporate, leaving only the heavy oils, so that the carburetter contains a very heavy mixture when next an attempt to start is made. Use slightly more oil than hitherto, and fit a hot air intake to the carburetter. We consider the use of heavy fuels at any time dangerous unless this be done. Also the crank case should be sheltered from cold air so far as is possible, the silencer of the baby Triumph answering a useful purpose in this direction.

Stopping a Blow Hole.

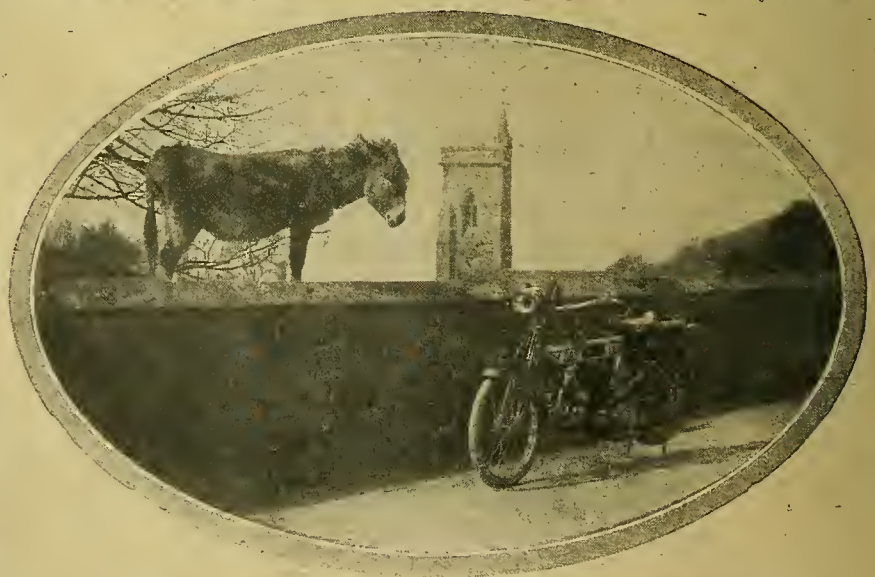
My Scott motor cycle when laid aside some months ago was running well. When trying it recently it was sluggish and uncertain, and I only ran it a few hundred yards, as I intended to clean the cylinders. On proceeding to do this, I found a hole in the bottom of the right-hand crank case chamber, through which all oil had escaped. The hole was small, and looked as if the sharp end of a file had been driven through it. I should like to know how this happened, but I am more anxious to find out how I can repair it. As you know, this is a most awkward place to execute repairs, the space is so narrow. Would any of the following be of use? The metal is aluminium. (1.) Pouring molten lead into the crank case. (2.) A short bolt with a large head and leather washer pushed from above downwards, and secured with another leather washer and nut.—W.W.

Possibly the damage was due to a flaw in the casting which has just developed. The hole could be repaired by acetylene welding quite easily, or it might be enlarged, tapped, and a brass plug screwed in. Pouring in molten lead would be of no help to you. The bolt idea, however, is quite good.

Poor Compression in Front Cylinder.

I have a 1915 7-9 h.p. twin Indian combination. My trouble is that I cannot get good compression in the front cylinder. In July I had the misfortune to score the front cylinder a little owing to the piston rings getting stuck. The local agent fitted a new cylinder and also step rings, which he thought would be best. Since then the machine has done about 250 miles, yet the compression is still very poor in the front cylinder. The machine is otherwise in perfect condition, having only done 3,800 miles.—A.L.

Loss of compression on the front cylinder of a twin-cylinder machine is a very common fault; it is usually caused through lack of lubrication. If the valves are carefully ground in, and the washer beneath the inlet valve seating is in good order and not allowing compression to escape, and you are sure the piston rings are a good fit, the only other cause on your particular make of machine is insufficient oil. You should then adjust your mechanical oil pump so as to direct all oil to the front cylinder; this is done by screwing down the little needle valve situated at the oil pipe junction on the timing case. Also make sure the pump is working properly. Remove small screw at the pump base to relieve any air locks.



["....."] A copy of the new edition of "Motor Cycles and How to Manage Them" will be presented for the best title submitted for the above picture before the end of the month.

Using an N.S.U. Gear.

Will you kindly tell me the correct way to change gear on the N.S.U. gear? (1.) Is it necessary to close the throttle entirely when changing or only to close it a little, as in this gear the clutch has to be withdrawn every time? (2.) Does it damage the gear to change down quickly, as if this is not done the machine loses way on a steep hill?—V.Q.

(1.) With this gear all that is necessary when changing is to prevent the engine racing; closing the throttle slightly is all that is needed. (2.) You cannot well damage the gear by changing down quickly; in fact, provided the machine is not travelling too fast, the quicker the change is made the better.

Soldering a Tank.

Would you kindly suggest a means of soldering a motor cycle tank? I have tried twice or three times with ordinary soldering materials after thoroughly cleaning the part, but the petrol still creeps through after a little time.—F.C.C.

See that all the surfaces to be joined up are bright and clean. Then dress the part with a good soldering flux and use a hot copper-ended iron, which must be properly tinned. This is done by cleaning till bright, heating, and dipping in flux, and the point is rubbed well with solder on a clean piece of tin till evenly coated with a thin plating. You will, of course, see that there is no trace of petrol in the tank before attempting the repair. If the leak is anything but a simple one you would be well advised to send the repair to a tank maker. A blow lamp may be necessary, but its use is very dangerous except in accustomed hands, owing to the likelihood of explosion in the tank.

Butt Ended Troubles.

My machine is a 3½ h.p. single-cylinder combination. Last spring, requiring a new tube for the driving wheel of the motor cycle, for convenience of repairs, I had a "butt end" put in, which cost then about 9s., but unfortunately it went wrong very quickly inside the butt. It was repaired by the makers, but went in the same way soon after; and I have had three others since—all gone in the same place, viz., inside the butt. I had them repaired, and put round the rim a thick lining of tape, thinking that probably a spoke head had caused the trouble; but to no purpose. I can blow the tubes up quite hard out of the cover, but they will not last long when fitted. Will you please give me your advice?—F.A.

Faulty fittings, butts not pushed firmly home, grit or dust between butts, dirt or grit in the cover, or creeping cover, are the chief cause of troubles such as you have experienced. Use plenty of French chalk on the joint when fitting ends together. Possibly the use of security bolts would improve things, but if fitted carefully the tubes should cause no trouble, as illustrated by the fact that many leading competition riders used to employ this type.

READERS' REPLIES.

Again—Which Wheel Lifts?

In reference to your reply to "F.C.B." in your last issue, you may be interested to hear that in June last, while I was a passenger in a Montgomery coachbuilt sidecar attached to a 1914 4 h.p. Triumph, the driver took a *right*-hand turn too fast, with the result that the whole outfit rose on to the sidecar wheel, which, being unable to stand the strain, buckled up, throwing me into the road. The outfit finished up lying on the near side of the sidecar. I had three very enjoyable weeks in hospital as a result of the accident, but the driver got off without a scratch, and the outfit sustained no further damage than a buckled wheel.—F. A. Hudson, Bombdr. R.F.A. (formerly H.S., M.G.C.)

Refusal to Fire on Front Cylinder.

In the issue of February 1st of the "good old blue 'un" a letter in "Questions and Replies," signed "A.H.L.," interests me, because I have had similar trouble with a Douglas, *i.e.*, erratic firing in the front cylinder. I tried *everything* your answer to him suggests, but it was of no avail. I even took the engine down, cleaned the pistons, cylinder heads, valves—everything I could think of. At last in desperation I took off the magneto and sent it to the makers for overhaul, and a partially broken down armature winding proved to be the cause of the trouble. The Douglas in question runs perfectly now.—M. W. Fyfield.

Tuning a Scott.

In *The Motor Cycle* for January 25th "T.J.D." is asking for hints *re* the Scott motor cycle. Regarding lubrication, you advise him to keep the plunger of the lubricator clipped down. If he uses this method I would advise him to make sure the machine is getting oil. If the pump washer is a tight fit, and there is the slightest air leak in the feed pipes or nipples, the machine will not get oil. If he desires to be quite sure regarding oiling, he should adopt the method described in *The Motor Cycle*, December 16th, 1915. For other hints you advise him to read the number for September 14th, 1916. I think he would get better information in the issues for July 15th and 22nd, 1915.

On February 1st "G.G." is also enquiring *re* the Scott, complaining of heavy consumption, low power, and low speed. All these may be caused by three maladjustments (I assume he has a Scott carburetter fitted): (1) Jet too large, (2) petrol level too high, and (3) magneto timing too slow. The remedy for No. 1 is fit a smaller jet or run with jet chamber cover partially or fully open. (2.) The level should be $\frac{7}{16}$in. or $\frac{1}{2}$in. below top of jet. Adjust needle spring until the float (with carburetter empty) just lifts the needle valve. (3.) The correct method of timing is as follows: Remove plugs, retard spark lever, put the bell crank lever on centre of rear segment, put the high gear in, revolve engine backwards by means of rear wheel until near side piston is just descending, and couple up.

I would strongly advise both correspondents, if they are using Scott carburetters, to fit an adjustable jet, when they will get better consumption and easier starting.—Jas. Thompson.

I wonder if "G.G." has detached the silencer drain pipe from the small silencer and thoroughly cleaned the holes in the drain pipe. Some Scott riders seem to think it is sufficient if they clean out the holes at the end of the small silencer, but to ensure good running the drain pipe must be disconnected from the small silencer every few hundred miles, and the drain pipe holes which open into the small silencer thoroughly cleaned; this is quite an easy job. With regard to petrol consumption, I have a 1915 Scott and sidecar, and when running with my wife, boy, and luggage—about twenty-four stone in all—I do not have any difficulty in doing upwards of 55 m.p.g. I have frequently checked this when touring in hilly country in Wales and Devonshire. With regard to "G.G.'s" third query as to the Scott machine being suitable for long journeys with a sidecar, I should like to say that I have found the Scott eminently suitable for work of this character. I have been several lengthy tours averaging over 100 miles per day, and have never had the slightest trouble, although I was perfectly ignorant of all things relating to motor cycling when I bought a Scott combination in 1915. The only hill on which I have failed to make a clean ascent with full complement of passengers has been the hill from Lynmouth to Lynton, and for this reason I think it would be an advantage if the Scott Co. would provide a low third emergency gear, which would be useful for crawling round the hairpin bends on such hills as Lynton.—H.E.G.

I observe in your valuable paper a question by "G.G." on tuning a 1914 Scott. I am the owner of a 3¾ h.p. 1914 Scott, with Scott carburetter fitted. Some time ago this machine developed the same trouble as stated in "G.G.'s" letter—no power on hills, excessive petrol consumption—but in this case it was very difficult to start. Several mechanics were heat to "cure" it, and as a last resource (being a mechanic myself) I tried a slightly stronger spring in the air valve of the carburetter. The result was I can start the engine from cold on top gear at walking pace, I have plenty of power on hills, and petrol consumption is 75 m.p.g. solo. It is an advantage, especially when using heavy fuel, to fit only one gauze of slightly wider mesh to each transfer port, and the fitting of Reliance plugs greatly helps the regular running of a Scott.—SD 2422.

RECOMMENDED ROUTES.

Coventry to Oldham.—J.T.

Coventry, Stonebridge, Coleshill, Weeford, Lichfield, Armitage, Rugeley, Stone, Newcastle, Red Bull, Congleton, Alderley, Wilmslow, Cheadle, Stockport, Hyde, Ashton, Oldham.

Shifnal to Reigate.—K.C.S.

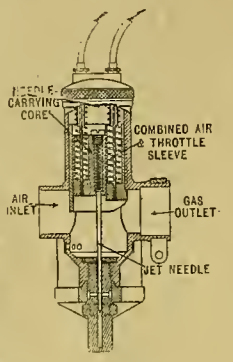
Shifnal, Bridgnorth, Kidderminster, Bromsgrove, Headless Cross, Alcester, Stratford-on-Avon, Shipston-on-Stour, Enstone, Woodstock, Oxford, Dorchester, Henley, Maidenhead, Windsor, Staines, Chertsey, Weybridge, Cobham, Leatherhead, Dorking, Reigate. Approximately 178 miles.

PATENTS

BY ERIC W WALFORD.

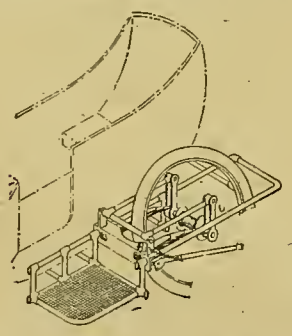
A Novel Carburetter.

This is a two-lever carburetter in which the levers, instead of operating a throttle and an extra air valve as usual, actuate (1) a combined air and throttle member, and (2) a needle whereby the jet opening is varied. The carburetter body is on the usual lines, and encloses a cylindrical sleeve, which on the inlet side controls the air going in, and on the opposite side regulates the gas passing out, the sleeve being cut away at its lower end to produce the required effect. Within the sleeve is a sliding core. This core is drilled centrally from the top to receive the jet-controlling needle, and the needle is pressed down by a spring retained in position by a screw cap. The taper of the needle is designed to give a gradually variable jet outlet, and the core carrying the needle is actuated by a Bowden wire. The air and gas control sleeve is similarly operated, and in combination the two means of control enable a wide variation in results to be obtained.—R. C. Davis, No. 16,755, 1915.



Sidecar Wheel Springing.

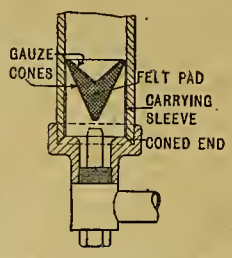
The perspective view shows clearly how the sidecar wheel spindle is supported at the ends of a pair of semi-cantilever springs. One spring is arranged at each side, and the spring ends are formed with eyes, in which the wheel spindle is secured. To prevent tilting of the wheel there is employed a rigid fork member, which is pivoted just above the



spring mountings, and the ends of this fork member are connected with the wheel spindle on either side by a pair of links. The construction forms a substantial spring mounting for the sidecar wheel, and the attachment member for the springs affords a convenient medium for the attachment of a footboard.—G. E. Rigby, No. 102,165.

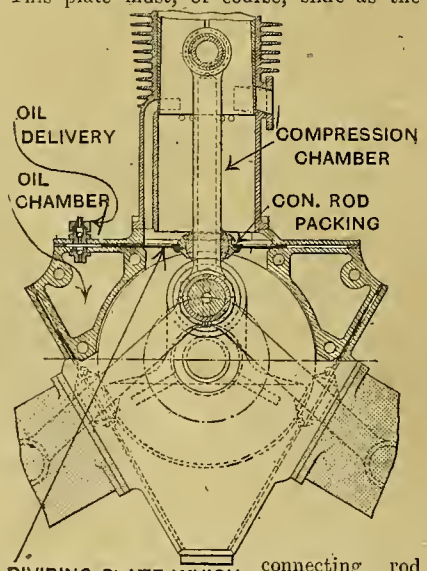
Improving the Mixture.

In order thoroughly to mix the petrol and air passing through the carburetter, there is arranged just above the jet nozzle a device which comprises a pad of felt or similar absorbent material confined between a pair of dished washers of gauze. The conical member thus formed is attached to a sleeve, which is coned at its lower end and secured in position by being gripped between the parts indicated. Thus the mixture is compelled to pass through the felt, with the result that an intimate mixture is produced.—F. Newton and J. Howarth, No. 17,011, 1915.



A Two-stroke Radial Engine.

It will be seen that in this engine there are three cylinders mounted upon a triangular crank chamber. The crank chamber and cylinders may be stationary, in which case the crankshaft will rotate in the usual manner, or the crankshaft may be fixed and the cylinders rotate. In the present engine the two-stroke cycle is employed, the initial compression of the gas taking place in the lower part of the cylinders. The lower end of each cylinder is cut off from the crank chamber by a sliding plate, which is formed with a universal packing through which the connecting rod passes. This plate must, of course, slide as the



connecting rod moves, and an important feature of the present patent is that the sliding of this plate is employed for the purpose of supplying lubricant under pressure. The lubricating oil is contained in compartments at the corners of the crank case, and there are arranged at the desired points inlet and outlet valves, which are shown as ball valves in the drawing. Movement of the dividing plate first sucks oil from the oil chamber, and then forces it through the ball valve to the supply pipe.—E. T. W. Addyman, No. 8,110, 1915.

SPARKLETS

Extra Postage.

The Stanley Motor Belt and Fastener Co. point out that motor cyclists ordering the box of Stanley spares by post should state the belt size, and add 2d. for extra postage.

Motor Cycle Supply.

We are informed by the Wulfruna Engineering Co., Ltd., Great Brickkiln Street, Birmingham, that they are in a position to supply motor cycles to the British public up to March 15th.

Bowden Replacements.

Being wholly engaged upon production for the British and Allied Governments, the Bowden Wire, Ltd., are unable to execute any orders for private purposes until further notice, but they have in stock certain goods suitable for replacements. Customers are invited to state their requirements in this respect, and, if possible, these will be met.

N.S.U. Gears.

For many years Messrs. Eagles and Co., 275, High Street, Acton, London, W., have specialised in the repair of N.S.U. gears. They will be happy to send to any reader of *The Motor Cycle* a pamphlet giving full particulars of the British-made N.S.U. gear, together with a sectional illustration, and an illustrated price list containing the numbered spare parts. All repairs to these gears, including the earliest types, can be executed within a few days.

J.A.P. Catalogue.

A new descriptive booklet referring to the 6 h.p. and 8 h.p. twin-cylinder J.A.P. engines is now available. Both engines are illustrated by carefully prepared sectional diagrams, and a perusal of the brochure should suffice to give any motor cyclist a thorough insight into the features of these two popular types. Besides this, the catalogue contains many hints and tips of value both to the expert and novice. A copy will be sent post free on application to Messrs. J. A. Prestwich and Co., of Tottenham, London, N.

B.S.A. Catalogue.

The reproductions in the 1917 edition of the B.S.A. motor cycle catalogue are effectively displayed in colour, and the specifications clearly and concisely given of both the 3½ h.p. and 4¼ h.p. machines. The list will be forwarded free on application to B.S.A. Co., Ltd., Birmingham.

Excelsior Catalogue.

We are in receipt of the latest catalogue of Messrs. Bayliss, Thomas and Co., Coventry, makers of the British Excelsior motor cycle. All models except the latest 4 h.p. twin are illustrated, but at present it is not known how many of the models it will be possible to make deliveries of, as it cannot yet be seen what effect the new manufacturing restriction Order will have.

WHITELEYS

WILL SUPPLY YOU WITH

ANY MAKE OF MOTOR CYCLE BY EASY PAYMENTS.

Delivery on Payment of £5 to £10 Deposit.

2% only added to List Prices for a year's credit.

Should you select a **CALTHORPE J.** two-speed (cash price, 38 guineas) you pay 16/- extra only. The machine is delivered after payment of **£8,** to be followed by 12 monthly payments of **£2 14s. 6d.**

In STOCK as we go to press:

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4½ h.p. No. 6 **JAMES,** 3-speed	£69 10
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2¾ h.p. **ALLON,** 2-speed, with clutch	£47 5
2¾ h.p. **CALTHORPE-J.A.P.,** 2-speed, variable ignition	£39 18
2½ h.p. **ROYAL RUBY,** 2-stroke	£32 10
2½ h.p. **ROYAL RUBY,** 2-stroke, 2-speed	£40 0
2¼ h.p. **CALTHORPE,** 2-stroke, 2-speed	£34 13
2½ h.p. **NEW IMPERIAL,** 2-speed, variable ignition	£40 19
2½ h.p. **NEW IMPERIAL,** 2-speed, clutch, and kick-start	£48 6
2½ h.p. **NEW IMPERIAL,** 2-speed, clutch, and kick-start, lady's model	£50 8
2¼ h.p. **LEVIS** Popular	£32 0
2¼ h.p. **JAMES,** 2-stroke, 2-speed	£42 0
2½ h.p. **IXION,** 2-stroke, 2-speed	£35 10
2½ h.p. **IXION,** single-speed	£28 10

Sole London Agents for the IXION MOTOR CYCLES.

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4 h.p. **CALTHORPE-J.A.P.** twin lightweight Combination. Enfield 2-speed gear, handle starter	£73 10
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3½ h.p. **ARIEL** Combination	£82 10

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7-9 h.p. 16F **HARLEY-DAVIDSON,** special H.-D. Sidecar, perfect	£92 10
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Packing free. :: Carriage paid to any address in the U.K

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West End Agents for the famous JAMES Motor Cycles.

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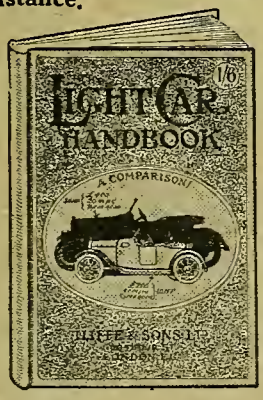
This is undoubtedly a book which will be found of the greatest service to every man or woman who owns, or is thinking of buying a light car, and wishes to drive and look after it without assistance.



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and all leading booksellers and bookstalls.

The LIGHT CAR HANDBOOK

(issued in conjunction with "The Light Car") is intended to assist owners and drivers of light cars to get a better understanding of the mechanism of the vehicles they use, and to give useful information and advice in respect to care and management. It is written by a private motorist who has had actual road experience with many different makes of light cars and who understands, therefore, exactly what the amateur motorist wants to know about the car he drives. The language is plain and concise.

The opening chapters deal with the economy of the light car, its usefulness and possibilities. Helpful advice is given on the choice of a car, and its equipment. The following chapters deal with chassis and engine construction and explain the working of the power and other units. Each important item of the car—the carburetter, magneto, lighting dynamos, cooling and lubricating systems, engine starters, gear box, axles, springs, brakes, wheels and tyres—is treated in a separate chapter and numerous illustrations are included to supplement the descriptions. The final chapters are devoted to coachwork, accessories, driving, garaging the car, and the law as it affects motorists.

List of Contents.

Chap.
I.—The Charm of the Light Car.
II.—The Choice of a Light Car.
III.—The Expenses of a Light Car.
IV.—A Typical Chassis.
V.—How the Engine Works.
VI.—Engine Design.
VII.—The Carburetter.
VIII.—The Ignition.
IX.—Engine Lubrication.
X.—The Engine Cooling System.
XI.—The Clutch.
XII.—The Change Speed Gear.
XIII.—Universal Joints and Back Axles.
XIV.—Front Axles & Steering Gears.
XV.—Frames, Springs, and Brakes.
XVI.—Tyres and Wheels.
XVII.—Coachwork.
XVIII.—Accessories.
XIX.—Lighting Dynamos and Engine Starters.
XX.—How to Start the Engine.
XXI.—How to Change Gear.
XXII.—The First Drive and Expert Driving.
XXIII.—The Car in its Garage.
XXIV.—The Owner and the Law.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed ——— & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed, "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged, when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

ABINGDON-KERRY, 2¾h.p., for sale, cheap; no reasonable offer refused; joining up.—109, Evering Rd., Stoke Newington. [8254

ABINGDON, 3½h.p., 1912, Bosch, free engine, etc., perfect, £15; semi-canoe sidecar, £3/10.—Smith, 199b, King St., Hammersmith. [8372

1915 5-6h.p. Abingdon, 3-speed, lamps, etc., coach-built sidecar, hood, screen, numerous spares; a good lot, and cheap; £55. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7692

A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [X5924

2¾h.p. A.J.S., 1915, lamps, horn, etc.; £35.—Thompson and Edwards, West Hartlepool. [X6026

A.J.S. 4h.p. Combination, direct from makers.—W. Brandish, Triumph Garage, Folcshill Rd., Coventry. [X5986

JUNE (1916), 4h.p. A.J.S., electric lighting, fine condition; £70.—Lieut. Hurd, Herts. Regt., Harrogate. [X6239

A.J.S., 6h.p., 1915, best A.J.S. sidecar, speeds, hood, wind screen, really good; £80; extended payments arranged.—Service Co., 292, High Holborn, London. [X6329

A WAR LOAN MOTOR BIKE?

IT would be a great convenience to you in your business to have a motor cycle, and you have the cash ready for its purchase! Yet you feel that all your available cash should be put into the War Loan.

IF this is your difficulty, perhaps GODFREY'S can assist you, as they can supply you with just the motor cycle or combination you require, and you can pay for it—

Not in Cash, but in War Loan Stock

a happy combination of patriotism and business being the result.

IN the case of second-hand machines purchased in this manner, GODFREY'S will allow **a special discount of 5%.**

IF you wish to keep your War Loan you merely deposit the stock as security, and pay for the machine in 12 equal monthly instalments. GODFREY'S will not charge you any interest, whilst YOU will be receiving interest from your investment, and on the final instalment being paid your War Loan Stock will be handed back to you.

Payments by War Loan Stock will be accepted for all, or any, purchase made during the month of February.

Write for our full and complete Lists of New and Second-hand Motor Cycles and Light Cars, and send particulars of any machine you may have to offer in part exchange.

GODFREY'S LTD.

'Phone: 7091 Mayfair (2 lines).

208, Gt. Portland St., LONDON, W.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

LATE 1914 6h.p. 3-speed A.J.S. and sidecar, almost equal new; £56 cash.—Else, Daisy Bank, Matlock. [X6353

2¾h.p. 1913 A.J.S., 2-speed, perfect order; what offers? —Capt. Edwards, c/o Read Bros., Tunbridge Wells. [8295

RIDER TROWARD'S, 78, High St., Hampstead.—A.J.S., 1914, 2¾h.p., 3-speed, clutch, kick start; 37 gns. [8338

A.J.S., 1915, 2¾h.p., 3-speed, b.b. clutch, kick start, Lucas lamps and horn, splendid condition; £40. Massey, Chartridge, Chesham, Bucks. [8400

1916 (late) 6h.p. A.J.S. Combination, 3 detachable wheels, not done 2,000, new condition, perfect; £95.—Lt. Moulds, Fairseat, Deepcut, Farnboro', Hants. [8311

1916 4h.p. A.J.S., complete combination, Lucas lamp and horn, nearly new tyres, mechanically perfect, little used; £85.—Robinson's Garage, Green St., Cambridge. [8475

1916 4h.p. A.J.S. Combination, all detachable wheels, spare wheel, speedometer, lamps, horn, and all spares, not done 2,000 miles; £85.—Wilkin and Co., Huntera Bar, Sheffield. [X6355

A.J.S., Nov., 1914, 2¾h.p., 3-speed, Binks carburetter, Lucas lamps and horn, in fine condition, very fast, will run well on substitutes; £38, or near offer.—Box L3,136, c/o *The Motor Cycle*. [8509

1918 6h.p. A.J.S. Combination throughout, hood, screen, spare wheel and tyre, Cowey, 3 best Lucas lamps, Lucas, Stewart horns, mirror, special saddle, spare chain, valve; cost £127; magnificent condition; £80, quick sale; cheap good solo wanted.—Lt. Huffam, 62, Mount Pleasant, Norwich. [8392

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

ALLON, 1916, 2 speeds, fully equipped, good as new; £35.—Buntings, Second-hand Department, Harrow. [8513

ALLON.—All 1917 models in stock, 36-45 gns.; exchanges and deferred payments arranged.—Maudes', 100 and 136 Gt. Portland St., London, W. Tel.: 552 Mayfair. [7367

RIDER TROWARD and Co., 78, High St., Hampstead.—Alldays Allon de luxe, 1916, 2-speed, clutch, kick-start, 33 gns.; 1916 standard 2-speed model, 29 gns. [8517

Ariel.

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

RIDER TROWARD'S, 78, High St., Hampstead.—1913 Ariel, variable gear, re-enamelled, overhauled; 19 gns. [8535

ARIEL, the reliable motor cycle, 3½h.p. single, and 5-6h.p. twin models; delivery from stock.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0839

I CAN Give Immediate Delivery of 1917 5-6h.p. Ariels, 3½h.p. Ariels, solo or combinations; exchanges or deferred payments. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7699

Arno.

ARNO, 2½h.p., Bosch, Druids, stand, carrier, and Grade gear, in first-class order and condition; £20.—Maxim, 31, Hainthorpe Rd., West Norwood. [0894

MOTOR CYCLES FOR SALE.

Auto-Wheels.

AUTO-WHEEL, 1914, perfect condition, new Palmer tyre, outer and inner; £8; trial ride.—Barrow, 14, St. Andrew's Rd., Willesden Green. [8516

AUTO-WHEEL, B.S.A. model, 12 gns.; also 1914 standard, £7/10; deferred terms if desired.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8320

Bat.

BATS.—P. J. Evans, John Bright St., Birmingham, Midland agent. Delivery from stock 4-5h.p. sporting model. [8409

BAT, 3½h.p., Triumph F.E. clutch, Bosch, B. and B., cane sidecar, all in perfect condition; a bargain, £18.—96, Ashbourne Rd., Mitcham. [8383

1914-15 Bat-Jap, 4h.p. sporting twin, countershaft 2-speed, T.T. bars, knee-pads, usual accessories; bargain, £38/10; combination or lightweight wanted.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [8429

Bradbury.

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage; £52/10.—Motor Exchange, Horton St., Halifax. [8344

BRADBURY, 3½h.p., N.S.U. 2 speeds, in real good order; £16.—Percy and Co., 337, Euston Rd., London. [8467

BRADBURY, 3½h.p., 1913, 2-speed, and Millford sidecar, overhauled; £35; extended payments arranged.—Service Co., 292, High Holborn, London. [X6332

1913-14 4h.p. Bradbury, N.S.U. 2 speeds, and C.B. sidecar, Gloriaphone, tyres and belt new condition, all lamps, spare covers and tubes, good condition throughout; £35.—43, Gould Rd., Twickenham. [8371

BRADBURY, 1913, 4h.p., S.A. 3-speed clutch hub, B and B., tyres good, recently overhauled, very fast; £25; seen 895, Fulham Rd., S.W.—Write, Gibson, 6d, Peterborough Villas, Walham Green, S.W. (D) [X6299

Brough.

BROUGH, late 1915, 3½h.p. T.T., horizontal twin, 3-speed hub gear, Watford trip, everything guaranteed brand new; £55, or exchange car, cash adjustment; photo.—Dickinson, Wireless, Hunstanton, Norfolk. [X6256

Brown.

3½h.p. Brown, F.E., fair condition; £12, lowest; deposit, approval.—E. Porter, Scredington, Lincs. [X6028

B.S.A.

B.S.A., 1917 models H and K, with sidecars, in stock —Moss, Wem. [X6394

COLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

1912 3½h.p. B.S.A., 2-speed, free, perfect; £24.—248, Bentley Rd., Doncaster. [X6031

B.S.A. 1917 Chain-cum-belt Models, £64; in stock, ready for riding.—Sharmans, Brackley. [X6376

B.S.A., 1914-15, T.T. model, fine condition, lamps, etc.; £32, nearest.—82, Bolsam St., Ploistow. [8397

B.S.A., countershaft 3-speed, fully equipped, new condition; 39 gns.—245, Hammersmith Rd., London, W. [8377

B.S.A., 1912, 2-speed, 3½h.p., free engine; £24, or nearest offer.—Cadet Mairhead, Keble College, Oxford. [X6305

1916½ B.S.A., 4¼h.p., speedometer, lamps, belts, complete; 55½ gns.—Hitchcox, 196, The Grove, Stratford, E. [X6206

B.S.A., 4¼h.p., 1917 Model K, run 40 miles; cost over £70; military reasons; £65.—E., 136, Duke St., Southport, Lancs. [8422

B.S.A., 1915, all chain combination, fitted lamps, horn, numbers, tools, splendid order; £58.—Batchelor, Clarence St., Kingston. [8485

B.S.A., 1916, all chain, overhauled, all accessories; £55; extended payments arranged.—Service Co., 292, High Holborn, London. [X6331

B.S.A., 1913, 3½h.p., clutch model, splendid condition throughout, footboards, lamps, very fast; 22 gns.—4, Dornberg Rd., Blackheath, S.E. [8405

1913 B.S.A., 3½h.p., 2-speed, clutch, with Montgomery C.B. sidecar, guaranteed perfect, and fully equipped; £35.—20, Whitley St., Reading. [8432

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529

B.S.A., 1917, 3-speed countershaft Model K, chain-cum-belt, with Canoelet Minor sidecar, only run a few miles, as new; £65.—Elce and Co., 15-16, Bishopsgete Av., Camomile St., E.C. [0551

1917 4¼h.p. B.S.A. K and 15 gn. Montgomery sidecar, has done under 1,000, in appearance and running is equal and better than new; £68, no offers.—Springfield, Corley Moor, Warwickshire. [X6393

1913 B.S.A. 2-speed, two in stock, belt drive, also one chain drive, £30 each; deferred payments arranged. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7700

MAUDES MOTOR MART

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SIDECAR OUTFITS.

TRIUMPH, 3½ h.p., 2-speed countershaft, Sidecar ... £30
INDIAN, 1913, 7 h.p., coach-built Sidecar, 2-speed *£35
ZENITH, 1914, 6 h.p., countershaft clutch model £50
RUDGE, 1913, 5-6 h.p. Multi, with Rudge Sidecar £40
ENFIELD, 6 h.p., 2-speed, twin, Enfield Sidecar £29
RUDGE, 1913, 3½ h.p. Multi, coach-built Sidecar *£30
SCOTT, 1914, 3½ h.p., 2-sp., and Scott sidecar £47
ZENITH, 1915, 3½ h.p., twin, clutch, and C.B. Sidecar £45
P. & M., 3½ h.p., 1913, 2-speed, C.B. Sidecar *£40
JAMES, 4½ h.p., 1914, 3-speed, Empress Sidecar *£45
HARLEY-DAVIDSON, 1916, 7-9 h.p., Bramble Sidecar.*£80
SUNBEAM, 1915, 3½ h.p. Combination *£78
SUNBEAM, 1916, 3½ h.p. Combination £82

LIGHT CARS.

G.W.K., 1914, 8 h.p., just re-painted £120
KNIGHT Junior, 1914. 11.9 h.p., sporting body *£145
SINGER, 10 h.p., 5 lamps, just being overhauled *£135
SINGER, 1913 (late), 5 lamps, dickey *£140
HILLMAN, 1915, 9.5 h.p., speedometer, little used.*£215
MATHIS, 1914, 15 h.p., 5-seater, dynamo .....*——
DAIMLER 38 h.p. Landaulette, C.A.V. set.....*£300
SWIFT, 1915. 10 h.p., dynamo, like new.....*£250
BELSIZE, 1912, 10-12 h.p., dynamo *£135
FORD, 1913, 20 h.p., 5-seater, windscreen £60
MORGAN, 1913, 8 h.p., hood and screen *£60
CALTHORPE, 1916, 10 h.p., 4-seat, dyna. and start £265
CALTHORPE, 1916, 10 h.p., 4 seat, dyna. and start £275
A.C., 1915, 10 h.p., dynamo, luxurious finish £275
HUMBERETTE, 8 h.p., 1913, wants overhauling £36

SOLO MOUNTS.

DOUGLAS, 1915, 2¾ h.p., 2-speed, model V..... £45
DOUGLAS, 1914, 2¾ h.p., 2-speed *£40
DOUGLAS, W. O., 1916, 2¾ h.p., 2-speed £50
TRIUMPH, 1912, 3½ h.p., clutch model, Bosch *£25
TRIUMPH, 1914, 4 h.p., 3-speed, Bosch.....*£40
TRIUMPH, 1912, 3½ h.p., Standard touring *£22
TRIUMPH, 1913, 3½ h.p., 3 speed, all accessories ...*£30
TRIUMPH, 1914. 4 h.p., 3-speed (late date) *£42
TRIUMPH, 1909, 3½ h.p., delivered 12.12.08 ..... £17
TRIUMPH, 1914, 4 h.p., 3-speed, electric horn *£41
INDIAN, 1914, 7-9 h.p., clutch model, speedometer .*£40
INDIAN, 3½ h.p., 1915, 3-speed, speedometer, small mileage £38
INDIAN, 1914, 7-9 h.p., T.T. model, very fast *£36
B.S.A., 1916, 4¼ h.p., 3-speed, mod. K., speedometer*£54
ENFIELD, 1911, 2¾ h.p. twin, 2-speed, chain drive..*£20
ENFIELD, 1911, 2¾ h.p. twin, Grado gear *£14
HUMBER, 1914, 2¾ h.p. twin, light touring machine*£17
HUMBER, 1914, 3½ h.p. 3-speed, water-cooled *£38
CALTHORPE, 1914 (late), 2¾ h.p., 2-sp., 2-str. *£22
IVY, 1915, 2½ h.p., 2-stroke, Senspray carburetter £12
REX, 1914, 4 h.p., 2-speed, and handle start £25
PREMIER, 1913, 2½ h.p , single-cyl., fine lightweight .. £12
F.N., 1912, 2¼ h.p., 2-speed, shaft drive £12
RADCO, 1916, 2 h.p., single-speed, almost new £20

Machines starred (*) are complete with lamps, horn, etc.

NEW 1917 MODELS.

ROYAL ENFIELD, 2¾ h.p., 2-speed, 2-stroke £44 2
B.S.A., 4¼ h.p., 3-speed, belt, K, 1917 model £64 0
B.S.A., 3½ h.p., Model D, T.T. £52 10
ROVER, 1917, 3½ h.p., 3-speed, solo £69 10
ROVER, 1917, 3½ h.p., T.T., Philipson pulley ... £61 10
ZENITH, 8 h.p., clutch and countershaft £85 10

NEW 1916's (Note Reduced Prices).

ROYAL RUBY, 2¾ h.p., 2-speed, J.A.P. engine.... £33 14
ROYAL RUBY, 2¾ h.p., 2-speed, 2 stroke £32 5
ROYAL RUBY, 2¾ h.p., J.A.P., single-speed £28 15
ALLDAYS ALLON, 2¾ h.p., 2-speed, and clutch ... £38 4
COVENTRY EAGLE, 2¾ h.p., single-speed, 2-stroke £30 15
LEVIS 2 h.p. Popular model £29 0

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MOTOR CYCLES FOR SALE.

B.S.A.

B.S.A., 1913, 3½h.p., 2 speeds, and clutch, fitted with vaporiser, runs perfect on paraffin, in really exceptional condition, complete with lamps, etc.; bargain, 30 gns.—Loweth, 58, Woodfield Rd., Ealing. [8302

1917 B.S.A.'s, models H and K absolutely in stock; also 1914 4 months' old model K, with No. 1 B.S.A. sidecar, all lamps, etc., a rare bargain, £67/10; deferred payments, exchanges.—Jones, Garage, Broadway, Muswell Hill. [8227

1917 B.S.A.'s, all models from absolute stock; cash, deferred, or exchanges, Douglases preferred. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. 'Phone: Hornsey 2562. [7702

B.S.A.'s, both 1917 models, actually in stock; deferred payments, exchanges; highest prices paid for good second-hand up-to-date machines in exchange; also 1915 Model K and Phœnix sidecar, heap accessories, £58/10; deferred terms if desired.—Lamb's, 151, High St., Walthamstow, and at 50, High Rd., Wood Green. Telephones: Walthamstow 169 and Hornsey 1956. [8323

Calthorpe

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799

CALTHORPE, 1915, 2½h.p. J.A.P., Enfield 2 speeds, guaranteed equal to new; £23.—Percy and Co., 337, Euston Rd., London. [8468

CALTHORPE, 1915 (late), Enfield 2-speed, in excellent condition; owner enlisted; £24.—Eager, 69, Raymouth Rd., Rotherhithe, S.E. [8399

CALTHORPE, 1915, 2-stroke, 2-speed, good condition; £20; joined up.—Driver Darke, Waterloo House, London Rd., Sutton, Surrey. [X6030

P. J. EVANS, Birmingham and District Agent.—Calthorpe 1917 models in stock; two-stroke and four-stroke lightweights, and 4-5h.p. twins, solo or as combination.—John Bright St. [8413

CALTHORPE, 2¾h.p. J.A.P., late 1915, Enfield 2-speed, free engine; £25, or nearest offer; new condition, running perfect; genuine bargain; accessories.—Goldsmith, 20, Wickham Av., Bexhill-on-Sea. [8278

CALTHORPE J.A.P.'s, 2-speed models in stock, 38 gns.; deferred terms if desired; also 1915 2-speed and accessories, fine order, £27/10; deferred terms if desired.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8321

Campion.

4h.p. Campion, 1915, mileage about 700, like new; £29/10 cash.—W. J. Glenn, Uppingham. [X6325

CAMPION, 1915, 2-stroke, 2-speed, condition as new; £25.—Brown, Outram St., Ripley, Derbyshire. [X6295

Chater-Lea.

CHATER-LEA, 8h.p., chain drive, 3-speed countershaft gear, thoroughly overhauled, fitted with commercial side basket; £45.—Trahair, Plymouth. [X6407

Chater-Lea-Precision.

CHATER-LEA, 8h.p. Twin Precision engine, 3 speeds countershaft, kick starter, chain driven, car tyres, exceptional coachbuilt sidecar, hood, and speedometer, in perfect order and condition throughout; £45.—Percy and Co., 337, Euston Rd., London. [8457

Clyno.

1914 2½h.p. 2-stroke Clyno, scarcely used, all on; £27.—Wilkin and Co., Hunter's Bar, Sheffield. [X6356

CLYNO 1912 6h.p. Combination, £35/10; Clyno, 6 h.p., 3 speeds, £24/10.—Motor Exchange, Horton St., Halifax. [8345

RIDER TROWARDS, 78, High St., Hampstead.—1914-15 Clyno coachbuilt combination, detachable wheels; 54 gns. [8531

CLYNO, 1914, No. 6 sidecar, recently overhauled, guaranteed; £65; extended payments arranged.—Service Co., 292, High Holborn, London. [X6333

1914 Clyno Combination, 3 speeds, clutch, kick starter, spare wheel, new tyres, wind screen, overhauled; £52.—Lieut., Norfolk Hotel, Arundel. [8499

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

Connaught.

1915 Miniature Connaught, nearly new; £20.—Norton, Llandrindod. [8275

BIRMINGHAM Agent, P. J. Evans, John Bright St.—1917 models of the famous Connaught two-stroke, standard 2¾-3h.p. models, either solo or with sidecar; miniature models, single or 2-speed countershaft gear; prices from 27 gns. [8411

Coventry Eagle.

COVENTRY Eagle, 1915, single speed, guaranteed condition; £20; extended payments arranged.—Service Co., 292, High Holborn, London. [X6334

Dot.

DOT-J.A.P., 8h.p., 1914, new condition, and sidecar; owner at Front; £50.—Taylor, 64, Promenade, Southport. (D) [X6327

MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS, 1915, 2¾h.p., T.T., overhauled and re-enamelled; £44.—Below.

DOUGLAS, 1914, 2¾h.p., clutch, lamps, horn, speedometer, tools, overhauled; £40.—Below.

DOUGLAS, 1911 2¾h.p. twin, single-speed, re-enamelled and overhauled throughout; £18; extended payments arranged.—Service Co., 292, High Holborn, London. [X6337

DOUGLAS, 1913½, 2¾h.p., T.T., like new; £30.—29, St. Leonard's St., Bow. [8394

1915 T.T. Douglas, 3-speed, perfect order; £47/10.—Teudell, c/o Read Bros., Tunbridge Wells. [8294

1916 Douglas, 2¾h.p., 2-speed, P. and H. lamps, equal to new; £50.—Scott, High St., Westerham. [8453

DOUGLAS, latest 2¾h.p. W.D. Model, faultless; £48; exchange entertained.—Pigot-Disney, E. Molesey, Surrey. [8390

DOUGLAS, 1914, 2¾h.p., T.T. model, with accessories; £42/10.—Moter Exchange, Horton St., Halifax. [8346

1914 Douglas, T.T. bars, complete, lamps, etc., £34; ditto, touring model, £35.—Cross, Effingham Sq., Rotherham. [X6373

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Yeovil. Tel.: 50. [5855

DOUGLAS, 2-speed, 1914, Philipson pulley, perfect; £38.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8076

DOUGLAS, 1914¾, 4h.p., 1916, coach sidecar, faultless condition; £55; exchange entertained.—Sinclair, East Molesey. [X6382

RIDER TROWARD'S, 78, High St., Hampstead.—Douglas, 1912-13, T.T., 2-speed, 24 gns.; 1913-14 T.T. 2-speed, 32 gns. [8525

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

DOUGLAS, 1915¾, W.O. Model, very late, complete, lamps, horn, fine order; £46.—Batchelor, Clarence St., Kingston. [8484

1915 Model W Douglas, condition as new, completely equipped, ridden 1,200 miles.—Williams, 19, Portland St., Cheltenham. [X6409

DOUGLAS, 2¾h.p., fine order, new tyres, plating, enamelling new, only wants seeing; £17.—14, Dodbrooke Rd., West Norwood. [0869

DOUGLAS, 1913, 2-speed, perfect order, £26; Douglas, 1910, good running order, bargain, £10.—Jeffery, Tidball, and Jeffery, Tiverton. [X6264

1913 2¾h.p. 2-speed Douglas, fitted with kick start, lamp, horn, tools, etc., in splendid order; £36/10.—F. E. Wootten, 55, High St., Oxford. [8494

4h.p. 1916 Douglas and Sidecar, electric lights throughout; also 2¾h.p. Douglas, W.O. Model, lamps, etc., £50.—Newton, Eaglescliffe, Co. Durham. [X6379

1915 2¾h.p. Douglas, lamps, horn, speedometer, Binks, new tyres, mudshield, spares, perfect condition; £40.—C/o Raleigh Co., Ryde, I.W. [8492

DOUGLAS Specialists.—Gibb, Gough, London Rd., Gloucester. Gibb, the International Douglas rider, winner of numerous cups and gold medals. [2218

DOUGLAS, 2¾h.p., late 1914, Model V, unscratched, new tyres, perfect running order, all accessories; £38, or near offer.—5, The Crescent, Maidenhead. [X6375

DOUGLAS, 1913, 2¾h.p., single speed, overhauled, re-enamelled, footboards, tyres perfect; £22/10, or nearest.—Waddams, 110, Orchard Rd., Erdington. [X6321

DOUGLAS, 1913, 2-speed, and clutch, large head lamp, tail lamp, mechanical horn, machine now being overhauled; a bargain, £32.—Ellis' Garage, Swanage. [X6308

DOUGLAS, 1916, like new, Watford, Stewart horn, College shields (detachable), rests, and footboards, Lucas rear and spares; £52/10. Higson, Charles St., Sheffield. [8442

DOUGLAS, early 1914, 2¾h.p., 2-speed, clutch, kick starter, footboards, recently overhauled, good condition; owner active service; £35.—Celston, Gerrard's Cross, Bucks. [8374

1915 Douglas, 2¾h.p., model U, 3-speed gear, footboards, upturned or touring bars, lamps, horn, speedometer, in perfect order; £50.—Robinson's Garage, Green St., Cambridge. [8473

DOUGLAS, 2¾h.p.—Brand new models W (clutch, kick start) and U; deliveries in few days to doctors and farmers. Write for particulars.—Robinson's Garage, Green St., Cambridge. [8472

1913-14 2¾h.p. 2-speed T.T. Model Douglas, very fast, grand condition; owner in army 18 months, done 4,000, guaranteed, lamps, horn; trial; £32, near offer.—Newman, Copen Hall, Blyth. [8339

DOUGLAS, model W, new December, 1915, clutch, kick-start, 2 Lucas lamps, horn, complete kit tools, pump, under 1,000 miles, excellent condition; £54/10.—Robinson's Garage, Green St., Cambridge. [8470

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4½ h.p.	**B.S.A.**, chain-drive	£66 0
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7-9h.p.	**HARLEY - DAVIDSON**, genuine 1917 model, Standard	£93 0
7-9h.p.	**HARLEY - DAVIDSON**, genuine 1917 electric model	£102 0
2¾ h.p.	**LEVIS** Model E, 2-sp. Enfield gear, rustless rims	£47 10
2¾ h.p.	**LEVIS** Popular model	£32 0
3½ h.p.	**ARIEL**, 3-sp., solo, kick-start	£65 10
2¾ h.p.	**CALTHORPE-J.A.P.**, 2-sp. feather-weight, 3 models in stock	£39 18
2¾ h.p.	**NEW HUDSON**, model C, 2-speed	£35 0
7-9h.p.	**HARLEY-DAVIDSON**, mod. 16F & Sidecar, 1916 model	£102 9
2½ h.p.	**ROYAL RUBY**, single-speed	£47 5
2½ h.p.	**ROYAL RUBY**, 2-sp., 7 models in stock	£40 0
2½ h.p.	**ROYAL RUBY**, 2-sp. J.A.P.	£46 0

SECOND-HANDS.

6 h.p.	**ENFIELD** 1916 Comb., speedometer, lamps	£85 0
6 h.p.	**ENFIELD** 1916 Comb., scarcely used, with accessories	£85 0
6 h.p.	**ENFIELD** 1916 Tradesman's Outfit, as new	£90 0
6 h.p.	**ENFIELD** 1916 dynamo lighting Combination, hood, screen, mirror	£98 10
3 h.p.	**ENFIELD** 1916 Touring Model, 2-sp.	£45 10
6 h.p.	**ENFIELD** 1916 Comb., elec. equip. (battery), 3 lamps, hood, screen	£85 0
	ENFIELD 1916 Commercial Box Carrier	£12 12
	ENFIELD 1916 Sidecar, hood, screen, only 2 months old	£16 10
2¾ h.p.	**CONNAUGHT**, 1916, only shop-soiled, lamp, horn	£29 10
	T.D.C., 1916, 2-sp., original tyres still on, spare tank	£25 0
2½ h.p.	**ALLDAYS ALLON**, 2-sp., clutch, all access.	£36 10
2½ h.p.	**COVENTRY-EAGLE**, 2-sp., 2-str., special price	£39 10
2½ h.p.	**JUNO-VILLIERS**, 1916, all access., mileage about 100	£33 10
4½ h.p.	**JAMES**, 1915, 3-sp., kick-start, lamps, horn	£57 10
7-9h.p.	**HARLEY-DAVIDSON**, mod. 16F, Canoelet Sidecar and access.	£89 10
2½ h.p.	**ALLDAYS ALLON**, 1915, single-speed, and access.	£27 10
1 h.p.	**AUTO-WHEEL**, B.S.A. Model	£12 12
1 h.p.	**AUTO-WHEEL**, Standard Model.	£7 10
2¾ h.p.	**CALTHORPE-J.A.P.**, 1915, 2-sp., and access.	£27 10
2½ h.p.	**LLOYD-VILLIERS**, 1916, single-speed, with lamp, horn	£31 0
2½ h.p.	**O.K. JUNIOR**, 1916, 2-sp., tail lamp Miller lamp, horn	£28 10
4 h.p.	**TRIUMPH**, 1914, 3-sp., and coach Sidecar with accessories,	£38 10
4 h.p.	**B.S.A.**, 1915, mod. K and Phœnix Sidecar, hood, screen, 3 lamps	£58 10
	ROVER Water-cooled Car, 2-seater, good order and condition. What offers?	
	SAXON 11 h.p. 2-seater, Stepney, speedometer, lamps	£112 10

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DREADNOUGHT, 1915, 2¾h.p., by Lloyds Motor Co., Villiers engine, 2-speed gear box, speedometer lamps, horn, tools, condition perfect, tyres as new.—60, Mayfield Rd., Sanderstead, Surrey. [X6022

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8013

1917 2¾h.p. Edmund, spring frame (Levis engine) Enfield 2-speed; £52/10.—Wilkin and Co., Hunter's Bar, Sheffield. [X6357

EDMUND Spring Frame, 2¾h.p. Levis engine, Enfield gear, full accessories, nearly new; £45.—Box L3,131, c/o *The Motor Cycle*. [8301

RIDER TROWARD'S, 78, High St., Hampstead.—1917 Edmund-Jap, spring frame, Enfield gear fully equipped, mileage 100, cost £50, illness cause of sale; 39 gns.; fully guaranteed. [8524

Enfield.

ENFIELD, 1916, 6h.p., and sidecar, as new, guaranteed; £78/10.—Below.

ENFIELD 3h.p. Twin, 1914, guaranteed; £38/10.—Below.

ENFIELD, 3h.p., done 120 miles only, unscratched speedometer; £52/10; extended payments arranged.—Service Co., 292, High Holborn, London. [X6340

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2¼h.p. 2-stroke £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

ENFIELD, 1914, 6h.p., coach combination; bargain £45.—29, St. Leonard's St., Bow. [8393

ENFIELD 6h.p. 1917 Standard Combination, £94/10 (2-seater sidecar £3 extra).—Lamb's (below).

ENFIELD 3h.p. 1917 Solo Model, T.T. and touring £57/15.—Lamb's (below).

ENFIELD 1916 Dynamo Lighting Combination hood and screen, like new; £98/10.—Lamb's (below).

ENFIELD 1916 Commercial Combination, new two months age, mileage 400; £87/10.—Lamb's (below).

ENFIELDS.—Two 1916 6h.p. combinations, standards, perfect condition; £85 each.—Lamb's (below).

ENFIELD 6h.p. 1916 Combination, electric equipment, battery ignition, acetylene optional.—Lamb's, 151, High St., Walthamstow, and at 50, High Rd., Wood Green. Telephones: Walthamstow 169 and Hornsey 1956. [8322

ENFIELD, 3h.p., 2-speed, kick start, perfect order £28/10.—Jeffery, Tidball, and Jeffery, Tiverton [X6266

ENFIELD, 1916, 2-stroke, as new, lamps, horn tools; £86.—Batchelor, Clarence St., Kingston. [8487

ROYAL Enfield 2-speed Twin Lightweight, just renovated; £25, or near.—5, Rainham Rd., Kensal Green. [X6524

1914 Enfield 6h.p. Coachbuilt Combination, in good condition, spares, etc.; £58/10.—J. H. Merritt, Knottingley. [X5808

ENFIELD 1916 6h.p. Combination, 2 speeds, latest sidecar, lamps, horn, tools; £75.—Batchelor, Clarence St., Kingston. [8486

1913-14 Enfield Combination, coach-sidecar, £57/10; 1912 Enfield, cane sidecar, £41/10.—Collier's Motories, Deal St., Halifax. [8347

ENFIELD Combination, 1916, 6h.p., 2-speed, condition as new; £78.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0491

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock for immediate delivery.—See below.

1917 6h.p. Enfield Coachbuilt Combination, with apron and mat, 2 speeds, clutch and starter, 9 gns.; extra for hood and screen, £4/19; Lucas lighting set, 15 gns.; 8h.p. J.A.P. engine, £2 extra.—Below.

1917 3h.p. Enfield, solo or sidecar mount, 2 speeds clutch, and kick starter; 55 gns.; sidecars free 7 gns.—Below.

1917 Enfield Two-stroke, 2¼h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright St., Birmingham. [8411

1916 Enfield 3h.p. Combination, lightweight coachbuilt sidecar, fully equipped, almost new; 4 gns.—245, Hammersmith Rd., London, W. [8377

3h.p. Enfield Twin, kick starter, new few weeks ago Lucas lamps, and horn, driven 75 miles; £50.—M., 5, Rugby Mansions, Addison Bridge, Kensington [8433

RIDER TROWARD, 78 High St., Hampstead.—Enfield, 1913, with 1915 underslung coach sidecar, 43 gns.; 1915 T.T. 3h.p. Enfield, mileage 1,500 35 gns. [8521

6h.p. Enfield, late 1913, coach combination, hood screen, new tyres throughout, condition O.K. spares; £44, absolute bargain.—13, Arklow Rd., New Cross, S.E. [8321

MOTOR CYCLES FOR SALE.

Enfield.

ENFIELD 1913 Combination, 6h.p., 2-speed, coach sidecar, lamps, and horn, splendid condition; £42; seen by appointment.—Seaborne, Seaton House, Queen's Rd., Watford. [X6272

Excelsior.

EXCELSIOR, 1915, 2-stroke, 2-speed, and clutch, lamps, speedometer; £25; seen by appointment.—Augston, 86, Church St., Kensington. [8270

AMERICAN Excelsior, 7-9h.p., 3-speed, clutch, kick starter, brand new, with Empire sidecar, almost new; £80; exchanges.—Service Co., 292, High Holborn, London. [X6330

F.N.

F.N., 2½h.p., 2 speeds, and clutch, shaft drive, footboards, fitted for substitutes, runs well; £12/12.—1, Gilpin Av., East Sheen, S.W. [X6270

Grandex.

RIDER TROWARD'S, 78, High St., Hampstead.—Grandex-Precision, new 1917, T.T. Model, 4h.p.; 3 gns. [8520

RIDER TROWARD'S, 78, High St., Hampstead.—Grandex-Villiers 2-speed 2-stroke, new 1917 model, in stock; 33 gns. [8519

Grippon.

GRIPPON, 2¼h.p., B. and B. carburetter, pedal starter, good tyres; £5.—Maxim, 31, Hawthorne Rd., West Norwood. [0890

Harley-Davidson.

HARLEY-DAVIDSON Models.

EXTENDING Purchasers are asked to carefully note that machines type 11F and 11J are 1915 models; 16F and 16J are 1916, and 17F and 17J are 1917 models. It is not possible to obtain 1917 model machines at less than our advertised list prices.

FULL Particulars of date and model of any machine will be readily furnished to enquirers giving engine number.—Harley-Davidson Motor Co., Ltd., 74, Newman St., Oxford St., W. [7997

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for immediate delivery 1917 Harley-Davidsons. [7863

1916 Harley-Davidson Combination, dynamo, speedometer, done 900; £75.—20, Whitley St., Reading. [8431

1915 Harley-Davidson Combination, speedometer, Lucas lamps, perfect; £60.—Sphinx, 64, Wellgate, Rotherham. [X6257

MODEL 16J Harley-Davidson Combination, new July, run 400 miles; £80; accept Scott part exchange.—351, Killinghall Rd., Bradford, Yorkshire. [8285

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802

LATE 1915 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0861

HARLEY-DAVIDSON 1917 Models delivered from stock on the best terms for cash, exchange, or easy payments; only one 1916 Model 16F left in stock, £84/15.—Below.

HARLEY-DAVIDSON Combination, 1916 electric model, 7-9h.p., 3-speed, excellent condition; £80.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0552

1916 Model 16F Harley-Davidson fitted with sporting Swan coachbuilt sidecar, lamps, horn, tools, etc., in splendid order; £80, a bargain.—F. E. Wootten, 65, High St., Oxford. [8493

HARLEY-DAVIDSON Combination, August, 1915, 4,000 miles, Kumfort patent mudguards, well kept, speedometer, and Low generator; £70.—A. Upson, 35, High St., Maidenhead. [8332

RIDER TROWARDS, 78, High St., Hampstead.—1915 Harley-Davidson, 7-9h.p., 3-speed, clutch, kick-start, 52 gns.; ditto, with dynamo lighting and coach sidecar, new July, 1916, 69 gns. [8532

HARLEY-DAVIDSON Combination, 1916 model, delivered September, complete with lamps and all accessories, only done 800 miles, condition as new; £87/10.—Burgess, Belmont, Coventry Rd., Yardley, Birmingham. [X6322

HARLEY-DAVIDSON, 1915, electric model, 7-9h.p., 3-speed, all in good order and condition, with Bramble sidecar (16 gns.), speedometer, spare tyre and tube, run about 1,700 miles; £65.—Ellis' Garage, Swanage. [X6307

HARLEY-DAVIDSON, 1915, 7-9h.p., 3-speed, not run 2,000 miles, engine just been taken down, in fine order, with large double-seated sidecar, a good family machine, or convert to side van; £55.—Ellis' Garage, Swanage. [X6306

HARLEY-DAVIDSON, 11J, late 1915, 1916 improvements to dynamo outfit, Swan 20 gn. sidecar, new tyres and spare, speedometer, etc., guaranteed; any trial; must sell; sacrifice 62 gns.—Wild, Bank House, Highworth. [8395

HARLEY-DAVIDSONS.—Immediate delivery; new magneto models, £84/15; several second-hand 1915 and 1916 combinations from £65; exchanges arranged.—Colmore Depots, 31, Renshaw St., Liverpool, and 211, Deansgate, Manchester. [0885

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Further Reasons why YOU should favour us with your enquiries.

12th January, 1917.

Messrs. H. Taylor & Co., Ltd.,
21a, Store Street,
Tottenham Court Road,
London, W.C.

Dear Sirs,—I have just been reading my "Motor Cycle" of this week's date, Jan. 4th, and was struck with your advertisement, and the many excellent testimonials which you have received from various people. On considering the matter, I must say that I can endorse the opinions mentioned in every way, and even would go further, and say that for courtesy, quickness of despatch, and business-like methods generally, I shall always recommend Taylors.

Yours faithfully,
38, Weymouth Terrace, MANLIO POLLINI.
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1916 6 h.p. **A.J.S.** Combination, spare wheel and tyre, fully equipped, guaranteed £105 0
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1915¾ 4 h.p. **A.J.S.**, 3-sp., kick-starter, fully equipped £72 0
JUNIOR TRIUMPH, latest new, 2-speed .. £44 2
2¾ h.p. **CALTHORPE-J.A.P.**, 2-sp., new .. £39 18
1917 7-9 h.p. **HARLEY-DAVIDSON**, electric equipment £102 0
Ditto, without electric equipment... £93 0
H.-D. Sidecar (extra) £24 10
1917 2¾ h.p. **ALLON**, 2-sp. and clutch, new, cancelled order, cost £47 5s. £42 10

Others from £20.

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Messrs. H. Taylor & Co., Ltd.,
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Dear Sirs,—I beg to thank you for sending the Renold chain so promptly, which came to hand on Saturday. I may mention that I tried not less than a dozen places before noticing that you dealt in "parts"; and I had practically given up hopes. Some firms did not take the trouble to reply, including one man who advertises weekly that he has all kinds of driving chains in stock for immediate delivery, **and I wrote him twice.** I also thank you for the Catalogue, and I shall know where to apply to when next requiring anything. Yours faithfully, J. L. D.

Tinol Soldering Outfits ..... 5/3 post free.
Electrician's flat-nose cutting Pliers 2/6 ,, 3d.
Sphinx Plug Cleaners ..... 6d. ,, 2d.
Forward Valve Stem Adjusters (per Set) ..... 6d. ,, 2d.
Taylor's Posthorn, black finish. Usual price 14/6 ..... 10/6 ,, free.
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HARLEY-DAVIDSONS.—Five genuine 1917 models in stock, electric equipment, £102; standard model, £93; Model C sidecar, £24/10; Model B, £22/10; only limited number of these machines available.—Lamb's, 151, High St., Walthamstow, and at 50, High Rd., Wood Green. [8319

HARLEY-DAVIDSON, 1915, 11F, and H.D. sidecar, new January, 1916, acetylene head, tail, and sidecar lamps, Klaxon horn, Stewart speedometer, 4,000 mileage, special machine, picked engine, thoroughly overhauled last week, and guaranteed in perfect condition, spares, tools, 4 good spare tyres, etc.; £78.—Masters, 74, Newman St., W. Museum 4070. [8527

Hazlewood.

1917 3½h.p. 3-speed Hazlewood, brand new; £73/10.—F. E. Wootten, 55, High St., Oxford. [8497

Hockley.

BRAND New Hockley, 2¾h.p., 2-stroke, drip feed oiling, aluminium footboards; bargain, £25; exchange considered.—Davies, Zoar St., Lower Gornal, Dudley. [X6377

Humber.

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882

HUMBER, 1917, latest models, 3½h.p. and 6h.p. horizontal twins, actually in stock.—Moss, Wem. [X6395

1914 3½h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863

1917 3½h.p. and 6h.p. Horizontal Twin Humbers; delivery from stock.—Wilkin and Co., Hunters Bar, Sheffield. [X6358

HUMBER.—P. J. Evans.—Delivery from stock, 1917 horizontal 3½h.p. twin, special W.D. finish.—John Bright St., Birmingham. [8416

RIDER TROWARDS, 78, High St., Hampstead.—1912 T.T. Humber, 3½h.p., new piston and cylinder, perfect, 15 gns. [8533

HUMBER Combination, 1914, 3½h.p., 3-speed, Millford sidecar, in excellent condition; £27.—32, White Lion St., Bishopsgate, E. [8292

1911 3½h.p. Humber and Sidecar, 2-speed, handle starting, Lucas lamp sets; £25; owner joining up.—Harold Camburn, Tunbridge Wells. [8382

Indian.

INDIAN 2-speed Combination, re-enamelled, perfect order; £38.—Slack's Garage, Stockport. [X6259

INDIAN 1916 Powerplus Combination, run 80 miles, only equals new; cost £115, accept £85.

INDIAN, 1915, 3 speeds, T.T.; a bargain, £42.—Percy and Co., 337, Euston Rd., London. [8459

RIDER TROWARD'S, 78, High St., Hampstead.—1915 Indian, 5h.p., T.T., 3-speed, clutch; 43 gns. [8528

5h.p. Indian Combination, 1915, perfect condition; £55; Fulford 19 gn. sidecar.—Brown, Belle Vue, Thetford. [X5868

1914 7-9h.p. T.T. Indian, free engine clutch, good condition; price £29.—129, Evelina Rd., Peckham Rye. [8542

INDIAN, 7-9h.p., 2-speed, clutch, Binks carburetter, good running order; £30.—Jeffery, Tidhall, and Jeffery, Tiverton. [X6267

INDIAN, 7-9h.p., 1916, clutch model, as new, tyres unscratched, perfect everywhere; £55 cash.—Suck, 22, Grange Rd., Ramsgate. [8257

1914, 7-9h.p. Indian, like new, 2 speeds, and clutch, spares; £40, or exchange lower power and cash.—21, Stanleys Rd., Tottenham. [8337

INDIAN Powerplus Model G, all accessories, splendid machine; £72; extended payments arranged.—Service Co., 292, High Holborn, London. [X6341

RED Indian, 5h.p. 3-speed twin, and Mills-Fulford sidecar to match, very fine combination; £62/10.—Moter Exchange, Horton St., Halifax. [8348

INDIAN, powerful, 7h.p., spring frame combination, beautifully equipped, coachbuilt sidecar, new chains, overhauled; cheap.—Blake, 216, Westbourne Grove, W. [8336

1916 5h.p. Indian and Millford sidecar, 3-speed, clutch, etc., beautiful condition; £68/10; approval if desired.—O. Brooke, Beeches, Bradley, Huddersfield. [8251

1915 7-9h.p. Clutch Model Indian, fitted with electric lamps, speedometer, horn, tools, etc., in very good condition; £50.—F. E. Wootten, 65, High St., Oxford. [8495

INDIAN, 7-9h.p., practically as new; owner at Front; any examination; first offer £55, no offers; only wants seeing.—Muskett, 88, Station Rd., New Southgate, N. [8283

INDIAN Combination, 7-9h.p., 1914, spring frame, kick starter, electric lamps and horn, speedometer, perfect condition; £52/10.—Ballard, 133, Archway Rd., Highgate. [X6263

1915½ Indian, 3-speed, and C.B. sidecar, clutch and kick start, speedometer, 3 lamps, all accessories and spares; bargain, £50.—68, Englefield Rd., London, N. 'Phone: 2980 Dalston. [8309

MOTOR CYCLES FOR SALE.

Indian.

1915 (late) 7-9h.p. T.T. 3-speed Indian and sporting coachbuilt sidecar, hand and foot clutch, disc wheels, electric light, excellent condition; £65.—Lt. Moulds, Fairseat, Deepcut, Farnboro', Hants. [8312

1915 7-9h.p. Indian, electrically equipped, luxurious coachbuilt sidecar, 3 speeds, 3 electric lamps, luggage carrier, spare chain, inner tube, tools; £70.—Apply by letter, Ellis, 24, Langside Av., Putney. [X6207

INDIAN. 1916, 7-9h.p., 3-speed gear, kick starter, clutch, 28×3 Dunlop tyres, as new, speedometer; tools, etc., with sporting model sidecar, not run 2,000 miles; £70.—A. Wood, Ltd., Garage, St. Annes-on-Sea. [8253

INDIAN Combination, 5-6h.p., 1915, electric lighting, 3-speed, clutch, kick start, accessories, perfect, Comfy coach sidecar; £60; private owner buying car.—Egland, Wellington Motor Works, off Blackboy Hill, Clifton, Bristol. [X6319

LATE 1914 Indian, 7-9h.p., 2 speeds, spring frame, Swan £20 sidecar, electric lighting, horns, lamps, watch, mirror, speedometer, luggage grid, insurance, spare chains, tyres, oil, petrol, etc., everything in splendid condition; bargain, £50.—25, Ashburton Av., Addiscombe, Croydon. [8366

Ivy.

IVY-PRECISION, 4½h.p., in fine order and condition; £20.—Maxim, 31, Hamthorpe Rd., West Norwood. [0871

IVY 2-stroke, 1915, overhauled, all lamps and accessories; £24; extended payments arranged.—Service Co., 292, High Holborn, London. [X6342

Ixion.

IXION, 1915, 2-stroke, 2-speed, excellent condition, well cared for; £25.—Coates, Jun., Glan-Conway, N. Wales. [X6324

James.

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803

JAMES, 1913, 86×96, countershaft gear, and coach sidecar; £39/10.—Motor Exchange, Horton St., Halifax. [8349

JAMES 2-strokes, 1917 models, for immediate delivery.—Colmore Depot, 211, Deansgate, Manchester. [0888

1913 James, and cane sidecar, in first-class condition, 2-speed, and kick start; £36.—Mr. Emmett Healey, Batley. [X5804

JAMES, 1912, 3½h.p., free engine, clutch, just overhauled; £20; extended payments arranged.—Service Co., 292, High Holborn, London. [X6343

JAMES 1915 3½h.p. Twin, 3-speed countershaft, kick start, h.c., lamp, horn, Bosch, Senspray, in good condition; £42.—Evans, Grocer, Buxton. [8259

JAMES, 1914, 4¼h.p., 3-speed countershaft, chain drive, all late improvements, splendid machine, in perfect order; £35.—Bowers, Albany Rd., Redruth. [X6204

JAMES 4¼h.p. Combination, 1916, Lucas dynamo lighting, many spares; £100 insurance policy, perfect throughout; bargain, £75, cost over £100.—2, Greenhill Rd., Harrow. [8310

JAMES 1915 Model No. 6 Combination, 4¼h.p., 3-speed, lamp, horn, speedometer; £57/10; deferred terms, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8318

JAMES, 1917 models, for immediate delivery from stock. Big "Four" combinations, with and without Lucas dynamo lighting set; 3½h.p. twin, and two-stroke models.—P. J. Evans, John Bright St., Birmingham. [8412

J.A.P.

1915 8h.p. J.A.P., with special designed torpedo sidecar, good sporting combination; owner called up; £84.—Sutton, 4, Edlington St., Denaby, near Rotherham. [X6300

1913 J.A.P., 6-8h.p., with cane sidecar, not been used since December, 1914, property of invalided soldier, many extras, all in good order; £39.—Gray, East Norton, Leicester. [X6369

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J.H., 1915, 3½h.p. M.A.G. engine, lamps, speedometer; £30.—Carlings Garage, Grange Rd., Middlesbrough. [X6261

Kerry.

1913 Kerry-Abingdon, 5-6h.p. twin, 3 speeds; £24.—Dunstan, 3, George St., Fenny Stratford, Bucks. [8261

KERRY, 4h.p. twin, overhauled and re-enamelled, in real good condition; £10/10.—Percy and Co., 337, Euston Rd., London. [8455

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LEA-FRANCIS, 1915, 3½h.p. twin J.A.P., Bosch mag., 3-speed countershaft gear, clutch, and kick starter, practically new, guaranteed perfect; £59.—Moss, Wem. [X6398

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Levis.

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LEVIS 2½h.p. Popular, late 1915, in first-class order; £22.—14, Dodbrooke Rd., West Norwood. [0895

LEVIS 2½h.p. Popular, 1915, in first-class condition; any trial; 20 gns.—Red Deer Garage, South Croydon. [8388

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804

1915 2½h.p. 2-speed Levis, splendid condition, lamps, horn, etc.; £30.—Wilkin and Co., Hunter's Bar, Sheffield. [X6360

1917 Popular and Model E Levises; delivery from stock; cash, exchanges, or easy payments.—Wilkin and Co., Hunter's Bar, Sheffield. [X6359

LEVIS Baby, 1915, used few months only, owner abroad, completely overhauled, unused since, splendid condition, tyres, belt perfect; 17 gns.—Seen 34, Forest Hill Rd., Honor Oak, S.E. [8380

LEVIS, 1916 Model E, Enfield chain drive, complete with speedometer, Lucas horn, Brooks saddle, 2¼in. Dunlops, and footboards, condition new; cost £55, price £40, no offers.—Levis, Electricity Works, Bexhill. [8435

1914 Levis Baby, in fine order and condition; a rare bargain, £19. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7695

Matchless.

MATCHLESS Motor Cycles; no quicker delivery obtainable than from Colmore Depots. [0881

MATCHLESS-J.A.P. 6h.p. C.B. Combination, perfect, like new; £52.—Slack's Garage, Stockport. [X6268

MATCHLESS, 1913, 6h.p., with 20 gn. Montgomery sidecar, accessories, splendid condition; £50.—Vine, Willingdon, Sussex. [X6262

MATCHLESS 8B Combination, 1914, 7-9h.p. M.A.G. engine, 3-speed countershaft gear, clutch, and kick starter, good order; £65.—Moss, Wem. [X6399

MATCHLESS 1915 Combination, M.A.G. engine, 3 speeds, new condition, done just over 5,000 miles; quick sale, £70.—Tarry, 102, High St., Bromley, Kent. [8401

MATCHLESS Combination, 1915, M.A.G. engine, Gloria sidecar, hood and screen, spares, exceptionally good condition, 7,500 miles; £75.—Legge, Riding Mill-on-Tyne. [X6027

1915 8h.p. Matchless M.A.G. Combination, 3 speeds, chain drive, 3 P. and H. lamps, perfect condition; £75.—Hubbard, Chalton St., Euston Rd., N.W. 'Phone: 2327 Museum. [8258

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MINERVA, 8h.p. twin, Bosch, N.S.U. 2-speed, free engine, sidecar, new tyres and belt, sound condition, fast; £15 cash.—Box L3,035, c/o *The Motor Cycle*. [7769

MINERVA, 3½h.p., good mag., tyres, belt, etc., low frame, splendid going order; bargain, £10.—Webster, The Poplars, Greenwich, Ripley, Derbys. [X6237

Moto-Reve.

1914 2¾h.p.—Moto-Reve, mag., speedometer, Druids, P.H. lamp set, new Dunlops, plated, enamelled, thoroughly overhauled; exchange for good B.G. S.O. lathe; sell £15.—Baynton, 43, Campbell Rd., Twickenham. [8407

New Hudson.

1914 3½h.p. New Hudson Combination, in perfect order; £50, a bargain.—F. E. Wootten, 55, High St., Oxford. [8496

NEW Hudson, 2¾h.p., 1915, 3-speed, kick starter, in excellent condition, all accessories; £28.—Harrison, Botwoods, Ipswich. [X6203

1913 3½h.p. New Hudson, 3-speed, and Montgomery coachbuilt sidecar; £32.—Wilkin and Co., Hunter's Bar, Sheffield. [X6361

NEW Hudson Combination, coachbuilt, 3-speed, kick start; bargain, £38.—W. and H. Motor Co., Ltd., 287, Deansgate Manchester. [8077

1913 3½h.p. New Hudson, 3-speed, free engine, wicker sidecar, excellent condition, 3 lamps, new tyres.—Particulars, Williamson, Hilton, Sanquhar. [X6405

NEW Hudson, 1914, thoroughly overhauled by makers, equal new, 3 speeds, 2¾h.p.; £30.—H. Farnrig, Upper Cumberland Walk, Tunbridge Wells. [X6238

NEW Hudson 1913 3½h.p. Combination, 3 speeds, clutch and starter, good condition, £28; 1912 combination, £22.—P. J. Evans, John Bright St., Birmingham. [8417

NEW Hudson, 1915, 3-speed countershaft, War Office model, all accessories, splendid outfit; £48; extended payments arranged.—Service Co., 292, High Holborn, London. [X6344

1915 4h.p. New Hudson and Sidecar, 3-speed countershaft gear box, all in splendid order and condition, all lamps, etc.; £52; deferred payments arranged. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7705

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NEW Imperial, 2½h.p., 2-speed, and kick start models, just arrived.—Gittins, Ltd., Oswestry. [X6401

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J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Imperial-Japs. Immediate delivery. [7862

RIDER TROWARD'S, 78, High St., Hampstead.—1915-16 New Imperial, 2-speed, perfect; 24 gns. [8537

COLMORE Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0805

1916 New Imperial, 2-speed, almost new, in splendid order; £28/10.—Jones, Garage, Broadway, Muswell Hill. [8503

1917 New Imperial-Jap, 2¾h.p., 2-speed, as new, all accessories; £35.—Green, 89, Wymering Mansions, Maida Vale, London. [8398

IMPERIAL-J.A.P., 1916, 2-speed, only ran 3 months, speedometer; £39.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8079

NEW Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0839

NEW Imperial 1917 Models for immediate delivery; model 1, 39 gns., No. 2 46 gns.; several second-hand 1916 machines from £30.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0886

NEW Imperial 1917 Models in stock; light tourist, 2 speeds, countershaft, 38 gns.; clutch and kick starter models, also ladies' models ready to drive away.—P. J. Evans, Controlling District Agent, John Bright St., Birmingham. [8410

Norton.

1916 3½h.p. T.T. Norton, perfect condition; £45.—Wilkin and Co., Norton Agents, Hunter's Bar, Sheffield. [X6362

NORTON Brand New Big Four, 3 speeds, combination; £89/10; first cheque secures.—Percy and Co., 337, Euston Rd., London. [8456

N.S.U.

N.S.U., 2-speed, almost new, adjustable, fits Triumph; £5/10.—Dugdale, 19, Kingsley St., Nelson, Lancs. [X6033

N.S.U., 1914, 2h.p., 2-speed, just overhauled, perfect running order; £15.—White, 12, Oakhill Rd., Sutton. [8367

N.S.U., 3½h.p., 2-speed, F.E., spring frame, good condition, tyres excellent; £19.—Boswell, 44, Stephenson St., Hartlepool. [8488

N.S.U., 2½h.p., 1914, overhead inlet, 2-speed, free engine, spring frame, tools, little used, tyres, tubes like new, fast, trustworthy; price £20.—E.B., Hill Hall, Epping. [8279

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1914 P. and M. and Sidecar, B. and B. carburetter, P. and M. 2-speed gear, front and rear lamps, and horn, complete, as good as new; £50.—Norton, Llandrindod. [8276

P. and M., 1910-11, 3½h.p., 2-speed model, new cylinder, piston, and rod fitted, perfect running order, accessories; trial; must sell; £25, bargain; seen any time.—81, Amersham Vale, New Cross, London. [8305

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1912 3¾h.p. Precision, in perfect condition; £20.—P., 1, King St., Twickenham. [X6235

RIDER TROWARD'S, 78, High St., Hampstead.—1914 Precision, 8h.p., countershaft 3-speed, coach-built sidecar, hood, screen, luggage grid, fully equipped, 43 gns.; 1914 4h.p. Precision, clutch model, 19 gns. [8523

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1911 3½h.p. Premier, in good condition; £18/10.—Norton, Llandrindod. [8277

PREMIER, 1912, 3½h.p., 2 speeds; £21/10, or with sidecar £25/10.—Motor Exchange, Horton St., Halifax. [8350

1914 3½h.p. Premier, 2 speeds, coachbuilt sidecar; £45; cash or easy terms.—H. E. Jones (Garages), Ltd., Swansea. [0823

PREMIER, 1915, 3½h.p., 3 speeds, countershaft, kick starter, and coachbuilt sidecar, in perfect order and condition throughout; 40 gns.—Percy and Co., 337, Euston Rd., London. [8465

PREMIER Combination, 1915, 3½h.p., 3-speed counter-shaft, W.O. model, racing sidecar, usual accessories, excellent condition; £45; appointment.—172, Brownhill Rd., Catford, S.E. [8068

PREMIER, 7-9h.p., coachbuilt sidecar, carefully driven, new tyres, recently overhauled, Bonniksen speedometer, grid, spares; on view Coventry Premier, Ltd., Coventry; cash offers.—Magill, 26, Tamworth St., Lichfield. [8271

1914 Premier, 3½h.p., 3-speed countershaft gear box, and sidecar, very comfortable machine, been perfectly kept in splendid order and condition; £47; deferred payments arranged. All machines advertised by me have been thoroughly overhauled and guaranteed value for money.—Jones, Garage, Broadway, Muswell Hill. [7707

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RIDER TROWARD'S, 78, High St., Hampstead.—1914 T.T. Puch, perfect; 15 gns. [8526

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26×2½ Grip-ribbed	20/-	31/6
28×3 Grip-ribbed	27/6	44/-

TUBES.—Continental, Elite, etc.

24×2	4/3	
26×2	4/6	6/9
26×2¼	5/6	7/9
26×2⅜	5/9	8/3
26×2½×2½	5/9	8/9
26×2½	5/6	8/9
26×3	7/6	9/6
28×2⅛	7/6	9/3
28×3	9/6	11/9
650×65	5/6	10/-

Butted, 1/6 extra.

BELTS.

CONTINENTAL—		
6ft. 6in. × ⅞in. lengths only	7/-	13/9
Midland Patent Wire Core.	Per foot.	List Price.
1¼in. section	1/6	2/9
1in. section	1/4	2/2
⅞in. section	1/1	2/-
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⅞in. section (7ft. lengths only).	1/-	1/5
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Studded or Ribbed Retreads.
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'Phone—Vic 'ria 6553.

MOTOR CYCLES FOR SALE.

Quadrant.

RIDER TROWARD'S, 78, High St., Hampstead.—Quadrant, 1913, 2-speed, clutch, perfect; 25 gns. [8536

QUADRANT, late 1914, 4½h.p., 3-speed solo, petrol starting device, spleadid condition; £30,—50, Thornhill Rd., Barnsbury. [8365

QUADRANT, 3½h.p., spring forks, mag., good tyres and belt, good order, and fast; £12.—14, Dodbrooke Rd., West Norwood. [0872

3½h.p. Quadrant, thoroughly overhauled; exchange for 4-cyl. 1912 F.N., or sell £18.—96, Greyhound Rd., Hammersmith. [8480

Radco.

RADCO, 2¼h.p., late 1915, practically unused; £16, no offers.—14, Dodbrooke Rd., West Norwood. [0898

Rex.

REX, latest model, 2 speeds, coach combination; £49/10.—Motor Exchange, Horton St., Halifax. [8352

6h.p. Rex Combination, perfect order, Roc clutch, mag.; £15, bargain. E. J. Hayes, Rogerstone, Mon. [8441

REX, 5-6h.p., Bosch, B. and B., sidecar, engine overhauled; 18 gns.—Hearsum, 45, Brownlow Rd., Willesden, N.W. [8384

REX, 1914, 5h.p. twin, free engine in back hub, in new condition; £17/10, a bargain.—Percy and Co., 337, Euston Rd., London. [8461

6h.p. Rex Twin, Bosch waterproof, Binks 3-jet, variable pulley, Druids, Whittle, 2-speed, handle start, sidecar; offers.—14, Blenheim St., Colne, Lancs. [8340

REX, late 1913, 6h.p. twin, with roomy sidecar, all accessories; £48, or offer; seen any time.—5, Onslow Mews West, South Kensington, London, S.W. [X6236

REX, 1913, 4h.p., sidecar, 2-speed, handle start, Xi'all cantilever saddle, dropped frame, adjustable handle-bars, Bosch, accessories, overhauled, splendid order, runs on substitute; best over £20, including petrol; or separately.—Seen 34, Forest Hill Rd., Honor Oak, S.E. [8381

Rex-Jap.

4h.p. Rex-Jap and Castor Wheel Sidecar, in perfect order, with Grade Multi pulley; £25.—Finch, 68, Broxtowe Drive, Mansfield, Notts. [X6295

Rover.

ROVER New 1917 Latest Combination, solo, and T.T. models in stock.—Moss, Wem. [X6397

COLMORE Depots, Birmingham and Manchester, for quickest delivery of Rover motor cycles. [0883

3½h.p. Rover, 1915, 3-speed, perfect order; £30.—Jeffery, Tidball, and Jeffery, Tiverton. [X6265

ROVER, 1913, 3½h.p., 2-speed, clutch model, and sidecar; £29/10.—Motor Exchange, Horton St., Halifax. [8353

1917 Rovers, T.T., countershaft and touring models; delivery from stock.—Wilkin and Co., Hunter's Bar, Sheffield. [X6364

ROVER Combination, 1917 model, new, for immediate delivery; £89/9.—Colmore Depot, 211, Deansgate, Manchester. [0887

BIRMINGHAM Agent for Rovers, P. J. Evans, John Bright St.—1917 models in stock for immediate delivery.—See below.

1917 3½h.p. Rover Coachbuilt Combination, 3-speed countershaft gear, De Luxe sidecar; 90 gns.—Below.

1917 3½h.p. Rover, sporting model, racing or semi racing handle-bars; £57/10; extra for hand-controlled Philipson pulley, £4/10.—P. J. Evans, John Bright St., Birmingham. [8408

1917 Rover Combinations, 1917 Rover 3-speed, countershaft.—W. Brandish, Triumph Garage, Foleshill Rd., Coventry. [X5887

ROVER Coachbuilt Combination, 3½h.p., 3 speeds, clutch, excellent condition; £48.—P. J. Evans, John Bright St., Birmingham. [8414

ROVER 3½h.p. Special Countershaft Combination, run only 2,000 miles, lamps, horn, tools; £68.—Batchelor, Clarence St., Kingston. [8483

RIDER TROWARD'S, 78, High St., Hampstead.—Rover, 1917, T.T., Philipson, electric lighting, cost £68, mileage 5; owner's death causa of sale; bargain, 59 gns. [8529

ROVER, 1915, 3½h.p., 3-spaad countershaft, speedometer, lamps (Lucas), tools, horn, etc., guaranteed; £50; extended payments arranged.—Service Co., 292, High Holborn, London. [X6345

ROVERS.—New models in stock; 3½h.p. T.T., with Philipson pulley, £62/17/6; 3½h.p. countershaft model, £73/10; cash, exchange, or deferred terms quoted.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0491

Royal Ruby.

1915 Royal Ruby, 2-stroke, 2-speed, indistinguishable from new; £22.—37, Arlington Rd., Surbiton. [8370

Rudge.

1915 Rudge, 3 speeds, complete, lamps, horn, etc., £34.—Cross, Jeweller, Rotherham. [X6374

MOTOR CYCLES FOR SALE.

Rudge.

1913 Rudge, 3½h.p., free engine, good condition; bargain, £20.—J. M. Jones, Penmaenmawr. [8375

RUDGE Multi, 1915, 5-6h.p., and sidecar, complete, speedometer, lamps, etc.; bargain quick sale, 42 gns.—53, Swaffield Rd., Wandsworth, S.W. [8454

RUDGE, 1912, 3½h.p., 2-speed, coach sidecar, £29/10; 1913 3½h.p. Rudge Multi, new coachbuilt sidecar, £37/10.—Motor Exchange, Horton St., Halifax. [8351

RUDGE Multi, 1913, 3½h.p., guaranteed throughout, just overhauled, accessories; £32; extended payments arranged.—Service Co., 292, High Holborn, London. [X6346

RUDGE, with or without sidecar, 2-speed, free engine, fitted with vaporiser for paraffin, excellent condition; £25.—Southbury House, Mytchett Rd., Frimley, Surrey. [8338

1913 3½h.p. Rudge Multi (1916 improvements), and coachbuilt sidecar, complete with screen, lamps, horn, and speedometer; £38.—Wilkin and Co., Hunter's Bar, Sheffield. [X6365

RUDGE, 1912, 3-speed, clutch, Whittle, Hutchinson, Palmer cord, mechanical horn, fine condition, with wicker torpedo sidecar, lot of accessories; £29.—Write, 42, York Rd., Walthamstow. [8434

RUDGE, 1912, free engine, Lucas front and rear lamps, pump, horn, spare valves, tools, etc., new belt, tyres excellent, 2½in. R.S., perfect condition throughout; £18.—B., 21, Semley Rd., Norbury, S.W. [8389

RIDER TROWARD'S, 78, High St., Hampstead.—1913-14 T.T. Rudge Multi, very fast, 29 gns., with underslung coachbuilt sidecar, 34 gns.; 1912 2-speed clutch model Rudge, 24 gns., with sidecar, 26 gns.; 1913 T.T. Rudge, special engine, 22 gns. [8521

Scott.

COLMORE Depots, Birmingham, and Manchester, for Scott motor cycles. [0806

SCOTT, late 1912, and sporting coachbuilt sidecar, in real good order and condition; £28.—Percy and Co., 337, Euston Rd., London. [8468

SCOTT, 1914, overhauled, fitted with pan seat, spare tank; £32; extended payments arranged.—Service Co., 292, High Holborn, London. [X6347

RIDER TROWARDS, 78, High St., Hampstead.—1913 T.T. Scott, 29 gns.; 1913 T.T. Scott, with underslung sporting sidecar, 34 gns.; 1914-15 Scott, 35 gns. [8530

SCOTT, 1913, and Bramble coachbuilt sidecar, Binks 3-jet carburetter, sight feed oil system, lamps, horn, etc., tyres good, perfect order; seen London; £42, or highest offer.—Box L3,132, c/o *The Motor Cycle*. [8299

Singer.

SINGER, 1913, 3½h.p., 2-speed, clutch model, and sidecar; £29/10.—Motor Exchange, Horton St., Halifax. [8354

3½h.p. Singer, free engine, Philipson pulley, sidecar, good condition; £25.—Holt, 118, Dairyhouse Rd., Derby. [X6361

1912 Singer, 3½h.p., free engine, complete, spares, good order; £23, nett cash.—Arthur Moody, St. Helens, Isle of Wight. (D) [8335

SINGER, 2h.p., Bosch, B. and B., Druids, M.A.G., overhauled, excellent condition; £15.—Head, 51, Hainthorpe Rd., West Norwood. [8452

SINGER, 3½h.p., 1912, new tyres, Service belt, £18; Grant pulley, £2; wanted, engine, complete, 8h.p. a.c. J.A.P.—Hughes, Dental Surgery, Abergavenny. [8288

1914 2¾h.p. Singer, new Dunlops, lamps, horn, complete, splendid condition; bargain, £23.—8, Hicks, The City Arms, High Cross Rd., Tottenham. [8334

Star.

4½h.p. 1915 Star, 3-speed countershaft, with coach sidecar, only done 500 miles.—Read Bros., Tunbridge Wells. [8295

Sun.

COLMORE Depots, Birmingham and Manchester, for delivery from stock of all models of Sun motor cycles. [0807

1915 (late) Sun-Villiers, good condition; sacrifice £15.—Lt. Moulds, Fairseat, Deepcut, Farnboro', Hants. [8314

SUN-VILLIERS, late 1914, 2½h.p., 2-stroke, lamps, horn, new tyres, good condition; £17.—Rodgers, Road Board Camp, Newhaven, Sussex. [8286

Sunbeam.

1914 Sunbeam Combination, 3 speeds, Lucas lamps, etc.; £60.—Cross, Jeweller, Rotherham. [X6372

1915 Sunbeam, 3½h.p., 3-speed, accessories, splendid condition; £60.—Box 716, c/o *The Motor Cycle*. [X6381

6h.p. 1915 Sunbeam Combination, new Palmer cords, 3in., lamps, Low generator; £90.—Brown, Belle Vue, Thetford. [X5867

1915 3½h.p. 3-speed Sunbeam Combination, fully equipped, excellent condition; £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0862

Not merely a Fancy Pattern.

THE Beldam Tyre is not merely a fancy pattern—it is designed on scientific principles. As a result it does not cut easily. It has most rubber where liability to puncture is greatest. It is narrow and crisp and has a side grip which makes "cornering" safe and comfortable. Apart from these advantages Beldam Motor Cycle Tyres last long.

The Beldam Tyre Co., Limited, Brentford, Middlesex.

New Zealand: J. E. Fitzgerald, 139, Lambton Quay, Wellington, Cape Colony: The Tyre and Motor Co., Rodney St., Port Elizabeth. India: Wilkinson & Co., 12, Dalhousie St., E., Calcutta. Ireland: P. Drohan & Sons, Carrick-on-Suir.

Retreads The Plant, Materials, and Men behind BELDAM RETREADS are the same as employed in making the famous Beldam Tyres—Quality is the note all through. Have your old Tyres retreaded in the Beldam way before they get beyond repair. Estimate of cost by return post.—The Beldam Tyre Co., Limited, Brentford, Middlesex.

Godbolds

MOTOR CYCLES FOR SALE.

Sunbeam.

SUNBEAM, 1916, 3½h.p., speedometer, lamps, horn, just overhauled by makers, perfect; £75.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8075

SUNBEAM, 3½h.p., new December, 1915, unused since April, all accessories; £65; lightweight wanted.—Buntings, Second-hand Department, Harrow. [8514

SUNBEAM, 1915, 6h.p., with best Sunbeam sidecar, overhauled and guaranteed; £85; extended payments arranged.—Service Co., 292, High Holborn, London. [X6348

1915 3½h.p. Sunbeam, 3-speed, countershaft, hand-controlled clutch, very good condition, 2 lamps, horn, usual tools; £60.—Robinson's Garage, Green St., Cambridge. [8471

SUNBEAM, 3½h.p., latest 3-speed, h.c. clutch, finished service green, little used, could really be sold as new; £78/15.—Robinson's Garage, Green St., Cambridge. [8474

T.D.C.

1914 3½h.p. T.D.C., Sturmey 3-speed, fitted substitute fuel, Bosch, Chater sidecar; £22/10, lowest.—Appleton, c/o Smith, 9, Laird St., Greenock. (Seen in London.) [X6404

Triumph.

TRIUMPH, 3½h.p., new tyres, splendid solo machine; £22.—Slack's Garage, Stockport. [X6260

1914½ 3-speed 4h.p. Triumph Combination, almost new, done 600; £47/10.—20, Whitley St., Reading. [8433

1911 Triumph, free engine model. T.T. bars, all accessories; £19.—Harvey Hudson, South Woodford. [0892

1910 Triumph T.T. Roadster, N.S.U. gear, new belt, tyres good; £20.—Harvey Hudson, South Woodford. [0893

TRIUMPH, 3½h.p., racing cylinder, lamps, horn, etc.; £22.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8078

1914 3-speed Triumph, speedometer, and all accessories, tyres almost new; 28 gns.—Box L3,138, c/o *The Motor Cycle*. [8511

TRIUMPH, 1911-12, good running, free engine, 2 speeds, £19/10, any time; sidecar, Quickfit, £2/10.—82, Balaam St., Plaistow. [8396

TRIUMPH, 1914¾, 4h.p., 3-speed, Montgomery sidecar, good condition, spares, accessories; 44 gns.—Messent, Billiter St., E.C. [8289

TRIUMPH, 1913, 3-speed, nearly new tyres and belt, guaranteed perfect mechanical condition; £30.—31a, Broomfield Rd., Chelmsford. [X6401

TRIUMPH, 1914¾, 3-speed, clutch, coachbuilt sidecar, little ridden, accessories, perfect throughout; £42.—32, Anerley Vale, Norwood. [8440

1916 Triumph Junior, very little used, all accessories, 2-speed gear; bargain, £32.—Lt. Moulds, Fairseat, Deepcut, Farnboro', Hants. [8313

WAR Department Triumph, 3-speed countershaft, large head lamp, been stored, unscratched; £58.—Willson, 22a, Princes Sq., Bayswater. [8443

1910 3½h.p. Clutch Model Triumph, lamps, horn, tools, tyres as new, splendid condition; any trial; £22, or offer.—Hill, Caldicot, Newport, Mon. (P) [8256

TRIUMPH, 2 speeds, and clutch, good condition throughout, lamps, horn, speedometer; accept £19/10 for quick sale.—43, Mortimer Rd., Kensal Rise. [8333

TRIUMPH, 1913, 3-speed, and clutch, complete with Gloria cane sidecar, in sound condition throughout; £37.—Apply Saturday or Sunday to Lamb, 5, Latham Lane, Gomersal, near Leeds. [X6234

TRIUMPH, 1907, £16/10; 1909, £19/10; 1909, 2 speeds, £22/10; 1910, £21/10; 1911, £22/10; sidecar, £3 extra; close cash offer considered.—Motor Exchange, Horton St., Halifax. [8355

TRIUMPH, 3½h.p., 1912, Grade Multi gear, thoroughly overhauled, new bearings, valves, tyres, belt, speedometer, Klaxon horn, lamps; £21; joining up.—70, Baring Rd., Lee, Kent. [8444

TRIUMPH, 1914, 4h.p., 3-speed, just been re-enamelled and plated, complete mileage under 2,000, guaranteed perfect.—County Engineering, 64, Staines Rd., Hounslow. Tel.: Hounslow 322. [8317

TRIUMPH, 1912, F.E., Philipson variable gear, Jones trip speedometer, extra heavy Dunlops, accessories, with Millford coach sidecar, new Michelin tyre; £27.—R. Abbott, 20, Burghley Rd., Kentish Town, N.W. [8328

TRIUMPH, 3½h.p., new enamelled, new 2-speed N.S.U. gear, Dunlop tyres, Lucas lamp, Pedley belt, fitted to Millford Corvette, coachbuilt sidecar, all as new, and perfect; any test; £35, or sell separately.—Carter, 82, Leghorn Rd., Harlesden, N.W. [8515

RIDER TROWARD'S, 78, High St., Hampstead.—Triumphs; nine in stock; one 3½h.p. 3-speed, 17 gns., with sidecar, 19 gns.; 1911-12 standard Triumph, perfect order, 19 gns.; 1912 T.T. clutch Triumph, 22 gns.; 1913 T.T. Triumph, re-enamelled, overhauled, 27 gns.; 1913 T.T. clutch Triumph, 28 gns.; 1913 T.T. Triumph, special overhead valve model, disc wheels, very fast, 28 gns.; 1914-15 T.T. clutch Triumph, re-enamelled, overhauled, 34 gns.; 1915 T.T. Triumph, special model, very fast, 38 gns.; exchanges; all guaranteed. Open 8 p.m. and Sundays.—'Phone: 5392. [8518

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SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

Motor Drivers in the Infantry.

THE demand for general service men in the combatant sections of the Army is such that hundreds of men who enlisted in the Motor Transport service of the Army Service Corps are being transferred to infantry battalions. Such is the information conveyed in letters to us on the subject, in which the writers express surprise, since the majority of them had previously been trade tested and approved, and consider that as motor drivers and mechanics they would be rendering better service to their country than in taking their places in the firing line. We are not clear at the moment whether the transfer applies only to single men —several readers who are affected are not precise on this point—or even to recent recruits, but it is a well known fact that much dissatisfaction has existed for a long time past that young able-bodied single men should be retained in "safe" jobs, when thousands of married men with family responsibilities are fighting with the bayonet. We believe that the combing out does not apply solely to the M.T., but whatever change is in process we can only urge that the Government's action must be dictated by the exigencies of the situation, and no patriot will need any further assurance than that. Such is the feeling of the country that the War Cabinet will have unanimous support in any action they may take to find sufficient reserves to maintain our combatant forces at full strength. Evidently sufficient technical men are now available for the Transport sections, for the original mistake of enlisting engineers in the infantry at the start of the war, and subsequently having to withdraw them after training, is too fresh in one's memory to admit of the likelihood of repetition.

This supposition is confirmed by the refusal of certain non-combatant units to accept young men of A category, who were until recently engaged on munition work, but are now debadged. The apparent rule is hard on youths in the engineering profession who had hoped to be able to continue in the M.T. or R.F.C., for instance, work which had attracted them originally. Though they have been engaged on war work for a long time past, they apparently are left with a limited choice of section.

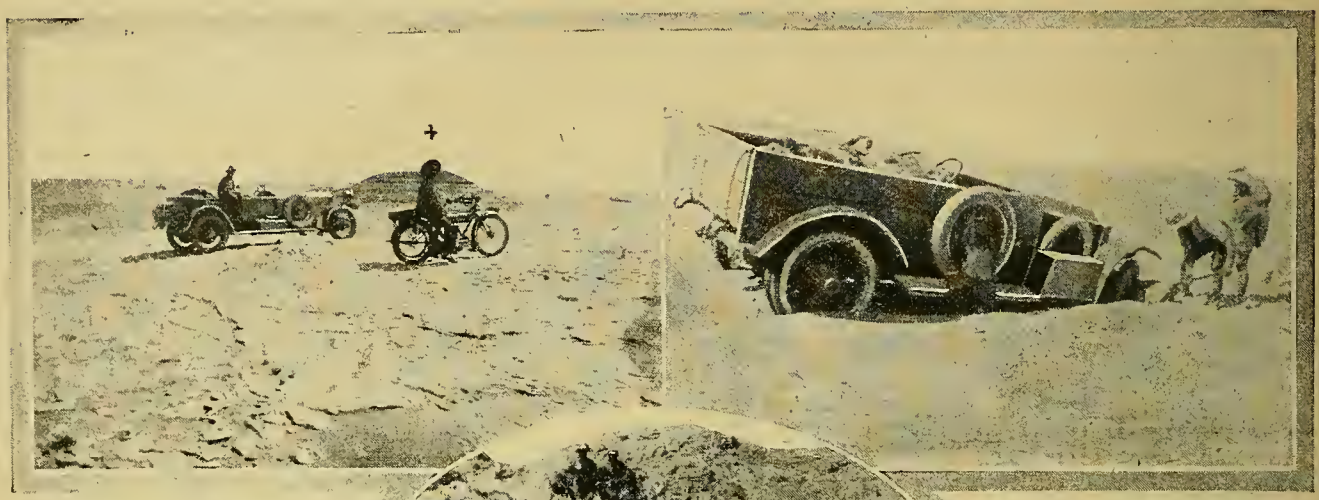
More Government Motor Cycles.

WE have on former occasions referred to the national work which the motor cycle industry has been able to render in this time of stress. As the hands were accustomed to working to the finest tolerances in peace time in the production of motor cycles, these factories were at once available for the production of important munitions. But apart from munitions as such, the staple trade of the factories—*i.e.*, the motor cycles which emerged therefrom in their hundreds in happier times—was found to have attained a degree of reliability and usefulness which rendered the machines absolutely indispensable as despatch carriers and connecting links between different headquarters and the army in the field. Derided in peace time the motor cyclist and his machine to-day are probably the most popular unit in the British Army. So far from the requirements of British and Allied armies having been satisfied by the different factories in the matter of motor cycles, it is pleasing to be able to record that at this moment a number of new factories have been pressed into the services of the Government, and are now busily engaged in the production of hundreds of new motor cycles. The Russian Government order, to which we have referred on several occasions in the past, has now been distributed among British firms, and it is refreshing to those who have worked hard in the perfection of the motor cycle for years past to know that the use of such machines is being extended right and left, and that they have long since been regarded as an inseparable part of a modern army.

An index to the advertisements in this issue will be found on the page facing the back cover.

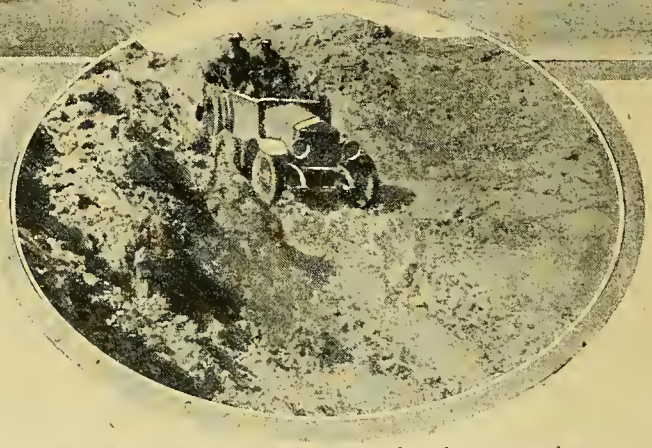
CHASING THE SENUSSI.

A Motor Cyclist with an Armoured Car Section operating on the Libyan Desert.



(1) A Rolls-Royce and a Triumph near the Boharia Oasis.

(2) A transport car in difficulties. This photograph conveys some idea of the appalling difficulties of transit encountered in Egypt.



(3) A "road" which is more reminiscent of a volcano crater than a highway.

THE following account of life in the Egyptian desert has been received from Cpl. L. Godsell, a despatch rider operating with an armoured car section. He reminds us that the majority of the men with the Rolls-Royce cars and motor cycles which he speaks of were recruited by *The Motor Cycle* for the Motor Machine Gun Service many months ago, and have much active service to their credit. Everyone has heard tales of the adventures with the Senussi—a tribe or sect of the Eastern Sahara which was many years ago organised with the aim of securing political independence of the Moslem world, and which, though not actually dangerous, has proved extremely troublesome. This is Cpl. Godsell's letter to the Editor:

Through Sand for 200 Miles.

"Most of the boys here were recruited by you and are in the best of health. One of the photographs is of myself on my motor cycle and of a Rolls-Royce car near the Boharia Oasis, which, as you will have seen by the papers, is now in the hands of the British. Two months before our occupation two officers had ventured out to reconnoitre this district, but never returned. They were captured by the Senussi. This outlandish place is most difficult of access, the surface being very hard rock. After we had done about 200 miles of soft desert sand we had to face ten miles of this appalling surface. Keeping pace with the Rolls was no joke, and the hard sharp rock was bad for the tyres, but the old Coventry bicycle behaved finely. Several times we had to put the machine on the Rolls box waggon to save the tyres for the return journey. A few days after this journey the oasis was taken by our troops, and afterwards we left that part for Dakhl. No. 2 shows the Rolls held up by a sand dune. Some of these dunes are 20ft. high, and are comparatively easy to get over, as the sand is crusted on top, but to do so they have to be taken at a good speed. When striking a dune the driver slips out the clutch, which prevents shock to the transmission. If the car does not successfully mount the rise, it dives in, and has to be got out for another try. We have travelled up and down the dunes for twenty miles without a stick. Then we get level plains from five to twenty miles long, with an occasional break of a few miles of hilly and very rough going, a strenuous test for the machines.

Since the accompanying notes arrived from Cpl. L. Godsell, news has been received that the operations against the main forces of Sayed Ahmed, the Senussi leader in the Western Desert, have just been brought to a successful conclusion.

It will be recollected that early last year the Senussi Sheik attempted to invade Egypt but was driven from the whole of the coast region of Western Egypt by the operations which ended in the re-occupation of Sollum. By the end of last year Kharga, Fanfara, Dakhl and Boharia oases had been cleared of the enemy, only Siwa and Jarakuts of Egyptian territory remaining in their hands. Kufra, in the Libyan Desert, is the permanent headquarters of the Senussi, and is 350 miles distant from Siwa.

A Rise of 1 in 3.

"One of the pictures will give you some idea of the rough ground over which we have to travel. The machines are on the cars in this case, as this was our return. On the way out we rode the cycles up this atrocious cliff, which is about 1 in 3. I hope you will be able to use some of these pictures for your paper, as they may be of interest to many of your readers. I get *The Motor Cycle* most weeks sent out by my friends, and I pass many an hour with it. I have just returned from a 300 mile run with Triumph bicycles and Rolls-Royce cars, and had a good run and very good luck, mostly plains where we could open out. It is hard for bicycles to keep up with the cars, but they stick it splendidly. The only trouble I had was an exhaust valve burn out. I noticed a writer in your journal a few weeks ago stated a 4 h.p. Triumph was never known to overheat or konk out. I have to ease my machine very often. It heats up in this country, and I do not know what engine would not do so, going 'all out' for ten to twenty miles at a stretch over such appalling tracts."

OCCASIONAL COMMENTS

BY "IXION"

"Drying Up."

EVERY now and then a passing allusion in our correspondence columns shows that the average rider is still as ignorant of the phenomenon vulgarly known as "drying up" as experts are bemused as to its precise significance. "Little John," to quote the latest example, calmly ascribes the tiring of his Douglas after a mile of speed to its possession of a flat twin engine, in sublime ignorance of the fact that practically any motor cycle engine will tire after a mile of full throttle under certain conditions. Let me quote two parallel examples. Exactly eleven years ago I bought a new Triumph motor bicycle which on first acquaintance intoxicated me, being a huge advance on the 1905 model. But the first time I took it out on a club scrap I made the disquieting discovery that it would "overheat" on the level. "Overheating" on hills was our universal experience in those days, but I had never before met an engine which would konk its heart out on the flat; and judge of my mortification after mopping up our entire membership on the homeward run, I ignominously dismounted on a hill consisting of 500 yards of 1 in 15 or thereabouts! In 1914 I was driving a water-cooled four-cylinder light car out of Tavistock towards Exeter, when it suddenly converted itself into a traction engine, and produced huge clouds of white steam.

Heat the Prime Cause.

IN both cases, heat was obviously the prime cause, as also in the "drying up" of "Little John's" Douglas. The Triumph experts, consulted in the first case, took out a deep-slotted exhaust valve, and fitted me another with a perfectly smooth head. The new valve effected no perceptible improvement, and I drove that machine very gingerly for three months until I met two strangers with similar mounts, both amateurs, each of whom vowed that his favourite plug (each a different make) was the only cure. I took the hint, got a dozen assorted plugs, and found that the engine always dried up with certain plugs, and never with others. The sole trouble was that the electrodes of badly designed plugs became incandescent after being submitted to a high temperature for a given time. In extreme cases, apparently, the electrodes reached such a temperature that ignition occurred too early for the highest possible speed on the level; with less atrocious plugs, one presumes, the firing point was delayed a trifle, and pre-ignition only became apparent when the engine was slowed down for a hill. There is a third, and more mysterious, trouble associated with the same causes; but this we will not name for the moment. These and similar memories returned to mind when the light cars of 1914 followed the example of the 1907 bicycles, and once again a change of plug produced an instantaneous cure. In all probability, "Little John's" Douglas would have lasted ten laps of Brooklands all out if he had simply changed his plugs.

"Silent Discharge."

IN common with many of our readers, I was very disappointed that the electrical experts showed so little interest when a contributor to *The Motor Cycle* suggested that under certain conditions, sometimes found in combination with a very hot engine, an electric current may leap the sparking plug gap without producing any spark at all. The idea was new to most of us, and may be fallacious. But any motorist who can boast a varied experience of hot engines, ranging from the first super-efficient 3½ h.p. bicycles to the 1914 light cars and the 1916 two-strokes, knows that some heat stoppages, alike on the level and uphill, are devoid of the normal symptoms of pre-ignition. The engine calmly peters out without any shock or noise, it silently dies away, and probably restarts quite obediently in a minute or two. That this phenomenon is produced by heat is undeniable. But the definition of the secondary cause is elusive. In the old days we used to suppose that the piston and cylinder, and maybe the valves, had undergone some fierce spasm of distortion, and that the compression had momentarily ceased to serve for a useful power stroke. Quite recently I have heard men guess that the sparking plug points expanded under the fierce heat till they met and shorted! The first of these speculations is absurd, and the second is not at all plausible. In the meantime the subject has surely received enough prominence by now for our newest and youngest readers to understand that "drying up" is almost universally ascribable to bad sparking plugs, or, in some cases, to the overheating of a second-class plug by some temporary defect in the engine, such as shortage of oil or insufficient exhaust tappet clearance.

Another Use of Graphite.

IN my experiments with graphite I have hit on one use of it which strikes me as really valuable. If you are troubled with piston rings gumming in their grooves, try putting a little graphite in the groove next time you fit a new ring. I am not going to say it is a certain remedy with baby two-strokes, some of which can practically weld up their top ring solid with the piston in a thousand miles, so that you have to chip it out by instalments with a cold chisel. But it retards the process even in these extreme cases, and seems to ensure the freeness of the rings in specially oily cylinders on four-stroke engines. Graphite is notoriously more resistant to heat than any other lubricant, and some enthusiasts state that it renders all carbon deposits much softer and easier to dislodge. However that may be, I am very pleased with the properties it displays in keeping the piston rings free in their grooves. I have not tried graphite grease for the purpose named, but employed Oildag, thinned with a *very* little cylinder oil, and brushed well into the grooves; if much oil is used, the tip will defeat its own object.

OVERHAULING AN ENGINE-SHAFT GEAR.

Instructions and Hints on Dismantling and Overhauling an N.S.U. Gear.

THE N.S.U. engine-shaft epicyclic two-speed gear was fitted to various makes of machines. Though of German origin, it is certainly a wonderfully efficient and neat means of obtaining a variable gear. The fact that it is to be found on numbers of motor cycles other than the N.S.U. is probably because it is one of the simplest gears to fit to a machine having a direct belt drive, and the ease with which it can be attached and detached renders it most useful to the rider who on many occasions prefers to use his machine as a simple single speeder, though occasionally a ride has to be undertaken which necessitates a variable gear.

Few riders seem to understand the construction or how to tackle the few simple adjustments generally necessary, knowledge of which may prevent any amount of trouble. I have frequently noticed queries in *The Motor Cycle* relating to the repair and adjustment of these gears, and so in the hope that they may be of use to other users I venture to offer a few hints which I have gleaned after over five years' use of the N.S.U. gear on a sidecar outfit.

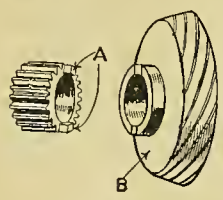


Fig. 1.
Central sun wheel and inner clutch cone.

Gear Slip.

Top gear slipping may be due to any of three causes, (*a*) clutch cone bottoming, (*b*) weak spring, or (*c*) operating bar tight. My experience as regards condition (*a*) is that the cone wears to an absolutely inappreciable extent, owing to the excellent design, and the main part certainly never bottoms. It is quite possible, however, for it to come up against the sun pinion, though this is very easily cured. The pinion in question is shown in fig. 1, together with the cone. The bottoming occurs at AA, the ends of the dogs on the pinion, and these may easily be ground down. I find that a clearance of 0.04in. is satisfactory. If there is real bottoming of the main part of the cone B, it will be shown by bright rings where the ends of the planet wheel spindles, which are not quite flush with the surface of the back of the female cone, have rubbed. Under these circumstances a new cone is, of course, necessary. The face B and ends of spindles referred to are untouched in my gear after five years' hard sidecar work. The coned rim will not bottom, since the inner cone is arranged, as shown in fig. 2, with plenty of clearance at C.

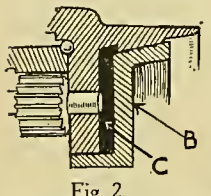


Fig. 2.
Clearance should be left at C to prevent the cone B rubbing on the planet wheel spindle.

With regard to slipping due to weak springs, I have never renewed the spring in my gear yet, and it appears to be quite strong enough.

I have had the usual trouble caused by a tight operating bar, and have had to grind down the inclined surfaces on the fork. After a time this can no longer be done, and a new fork or new top gear cone clutch is necessary. It is almost impossible to produce the same effect by reducing the diameter of the operating bar, as there is practically no lateral clearance and jamming results. The dismantling or assembling of the N.S.U. gear is always regarded as a tricky operation, principally on account of the spring. With the aid of a lathe it is very simple. The most important parts to be dealt with in assembling or dismantling are as follow, and are clearly shown in fig. 3 :

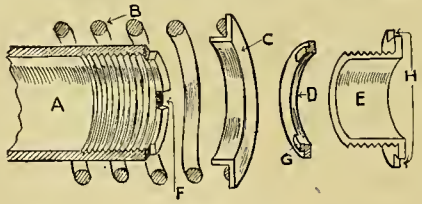


Fig. 3.
Section of the main shell on engine-shaft, showing spring, spring washer, and slide.

A Main shell fixed on engine-shaft by nut working inside part A.

B Spring.

C Spring washer, slides on outside of part A.

D Locking washer. Dogs G (two) fit inside C, being of same (outside and inside) diameter as tube A, and engage in two of the four slots F. Note outside diameter of D is about $\frac{3}{16}$in. less than that of C.

E Main locking nut screws in A, and is turned by tool engaging in slots H. Note outside diameter of E is same as that of D. Note also that E is of such a length that the gear can be withdrawn from crankshaft by unscrewing central nut, a shoulder on which engages against the inside edge of part E.

Assembling the Clutches.

The great difficulties are :

(1.) To compress the spring and engage the threads of E and A. Note that the slots F make it very easy to cross the threads.

(2.) To get dogs G in slots F. The latter are hidden by C when the spring is compressed.

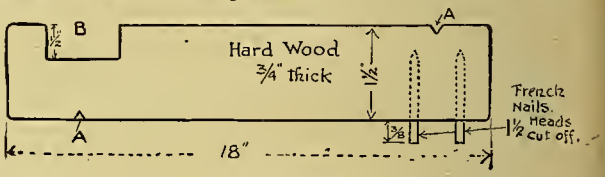


Fig. 4.
A useful tool which enables the gear to be dismantled with a minimum of trouble.

A Useful Tool.

A useful tool, which can be made in ten minutes and used in conjunction with a lathe, enabling the gear to be dismantled, cleaned, oiled, and reassembled in half an hour, consists of a piece of hard wood, its construction being clearly seen in fig. 4.

The french nails are at a correct distance apart, and fit in slots H (fig. 3) of nut E. The jaw B is of such a width that it will pass over the outside of D and E, but not over C. AA in the wood are centre punch holes for the tail-stock centre of the lathe.

Knock off the ring from the gear which keeps the outside stationary ring in place and remove the latter. Mount the gear in the lathe as shown in fig. 5.

It will be found that the first step of the drill jaws of a 3in. Cushman chuck will grip the inside of the pulley well enough, but pressure must be kept on the right-hand end of the gear by the tail-stock *via* the tool just described, the nails C of which are engaged in the slots of the nut E (fig. 3). Reverse the lathe by pushing the top of the pulley of the

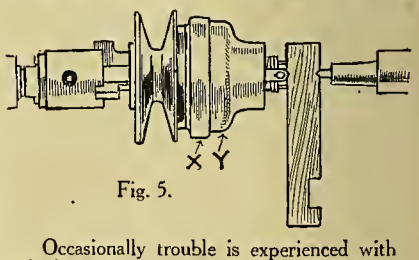


Fig. 5.
Occasionally trouble is experienced with the locking ring slipping. A remedy is to fit a screw through the main case and the ring.

Overhauling an Engine-shaft Gear.—

gear with the left hand, and decrease the pressure of the tail-stock gradually, keeping the nut stationary by means of the tool. The gear may then easily be dismantled.

To reassemble, remember first of all to put the nut holding the gear on the crankshaft inside A (fig. 1). Assemble the parts in the order shown (B, C, D, E), compress the spring by means of tail-stock *viâ* tool, as shown in fig. 5, and very carefully engage E and A (fig. 3). There need be no pressure on E if the nails C in the tool are long enough to go through the slots H and press on the face of D. Beware of crossing the threads. Screw up till tight, and then back half a turn. Reverse the tool so that the jaw B in the tool compresses the spring *via* the washer C, leaving D and E free. Compress the spring until slots F in A appear. Engage dogs G in D with slots F by pushing D round with a piece of wire, and screw E up (using same wire and slots H) sufficiently to prevent G and F becoming disengaged. Reverse the tool and screw E up tightly. E must be screwed right home, otherwise it may foul the operating bar and cause clutch slip.

Lubrication.

If a lathe is not available, a vertical drilling machine could be used with a slightly different tool.

For lubrication use ordinary engine oil. On an N.S.U. machine the gear gets some oil from the crank case release in the centre of the shaft, and one thorough clean up and oiling will last months.

I have had trouble with the locking ring which locks the main ball bearing adjustment (marked X, fig. 5). This refused to keep tight. I cured it by drilling and tapping a hole right through it and the main case of the gear (marked Y). A screw through the two (a tight fit) cured this fault permanently.

My experience of the gear on all other points is that it is absolutely satisfactory, and it is a pity some British manufacturer does not make an English version of it. ALPHA.

Steel Cylinders of German Aero Engines.

SUPERIOR EFFICIENCY DEMONSTRATED.

THE desirability or otherwise of fitting steel cylinders to motor cycle engines is a subject which has of late led to some controversy in our correspondence columns, and there appears to be a diversity of opinion as to whether the designer of one highly efficient motor cycle engine, notably the A.B.C., is following justifiable lines in the face of modern research by adopting steel cylinders. *Apropos* this controversy, an article appearing in the current issue of our contemporary *The Automobile Engineer* should be of especial interest to motor cycle designers. This article is the fourth instalment of what is undoubtedly the fullest technical description to be published in this country of the German Aeroplane Engine Trials, which took place just prior to the war, and whilst setting forth many points of deepest interest as regards lubrication, carburation, cooling, etc., of high efficiency air-cooled engines, it indicates forcibly the possible merits of the steel cylinder. In the following paragraph we propose briefly to review those portions of the article which bear upon this important point.

High h.p. per Unit of Capacity.

Passing on from the subject of dissipating heat from the piston—on which score it is pointed out that if insufficiently cooled the crown of the piston becomes red hot, with the result that serious lubricating troubles arise—the writer continues: "From this it follows that the cooling of the cylinders is most important, and one of the most interesting lessons learned from the trials was the value of the steel cylinders which were used in one engine, whereby the thickness of the wall could be reduced and better cooling obtained. The engine which was fitted with steel cylinders actually showed the highest horse-power per unit of capacity, which bears out these conclusions."

In this competition a four-cylinder engine won the first prize, and owing to the fact of low weight per horse-power (which involves fuel consumption, and necessitates compactness of the power unit), most of the entries were four-cylinder engines. The six-cylinder engine was at a disadvantage owing to its increased length of piping, greater overall length, its larger number of bearings and detail parts, and, adds the writer, "It was only on account of the better cylinder cooling, due to the employment of steel cylinders, that the six-cylinder engine was able to take second place."

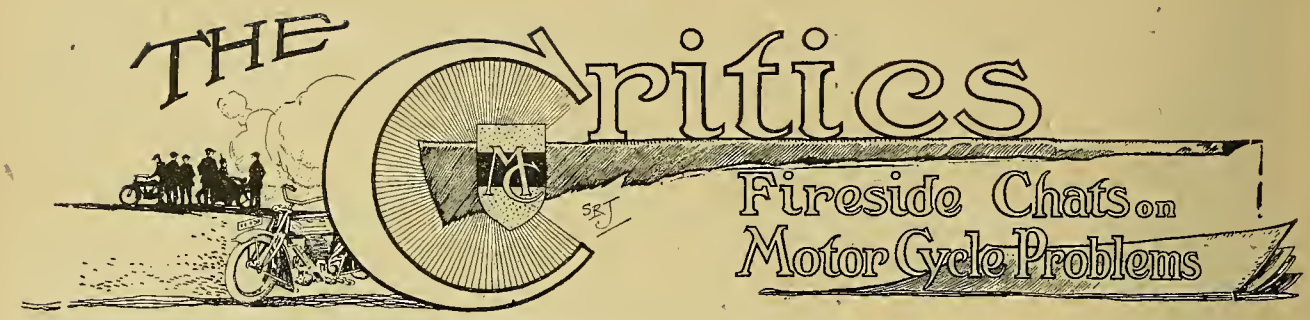
A Striking Testimony.

Summing up the results of the trial, the writer in our contemporary says: "One of the most striking lessons obtained from these trials was the advantage gained by using steel cylinders. In consequence of the thinner cylinder walls available the compression could be raised without affecting the pre-ignition point, and therefore the mean effective pressure was higher."

The Germans have no doubt exhibited an exceptional capacity for investigating technical matters, especially those which may have a possible bearing on the subject of military efficiency; that they have spared neither trouble nor expense would seem to warrant that, whatever decisions these trials may have brought about, such decisions were not hastily arrived at, but were the result of long research and practical experience. Motor cycle designers have already learned much by following the development of the aero engine, but we have still much to learn, and now, while neither money nor labour is being spared in the gigantic struggle for supremacy, is the time when the British manufacturer should sit up and take notice. The cost of production is, of course, a vitally important point, and it yet remains an open question whether or not the advantages of the steel cylinder are sufficient to outweigh its high cost of manufacture.

BOVINE CURIOSITY.

The Indian sidecar belongs to Marcel Krieger, of Geneva, who is, we understand, attached to the British Ministry of Munitions. He snapped the cattle, who appear so keenly interested in the combination, whilst on an excursion in the Swiss mountains. Observe the surface of the road; it proves a motor cycle's capacity for negotiating even wild mountain tracks. The picture was taken at an altitude of 5,400 feet above sea level. No wonder the cattle were surprised!



IT was the Novice who kicked off with the pertinent enquiry, "Why do manufacturers produce sidecar outfits costing, say, £115, when one can get a full-blown four-wheeler car at that price?"

The question was evidently shot at the Manufacturer. "It is not that they aim at a sidecar outfit costing £115," answered the latter, "but that they aim at producing a tip-top vehicle complete in every detail, which cannot be made at less."

"Good!" agreed the Novice. "But do you imagine that sidecars of this kind will hold their own against the low-priced light car manufactured on the quantity basis?"

Looks versus Upkeep.

"Unquestionably they will," replied the man of practice. "You people who talk about the cheap quantity produced car must not imagine that the motor cycle manufacturer is asleep. He also is going to produce in quantities, and, given the same systems of manufacture for both, the motor cycle outfit will always remain considerably cheaper than a car of the same quality. Then, again, you want to remember that purchasing cost is by no means everything. The sidecar outfit costs infinitely less in oil, petrol, tyres, storage, and taxes than any car. Ever since its appearance people have predicted its failure, yet practice has proved it to be a highly desirable type of machine. Where one man can afford £1 a week running expenses, fifty can spare 10s. for their motoring pleasures."

"Take the case of the beginner," the Novice argued, "the man in the street. He sees two vehicles at approximately the same price. One offers him a cushioned seat, security from the weather, the comfort of a windscreen; while with the other he knows that he will have to don overalls, and that even then he will be exposed. Which is he going to buy? I say he will plump for the four-wheeler every time!"

Quantity or Quality?

"Not *every* time," interposed the Manufacturer mildly. "Only the first time. You see it is all a question of quality. The beginner has no taste, but, as a rule, he acquires it. Thousands never acquire it, but the majority do. And next time they ask themselves, 'Which am I going to have, the best of one type or the cheapest of the other?' That's what it amounts to. One is the cheapest of its class, the other the best and the most costly. Which is the man with a year's experience of machinery going to choose? Besides, some will burn their fingers over the running cost question."

The Novice looked appealingly at the Journalist, whose summaries were usually fairly judicial.

"I must say I agree with everything so far," said the somewhat sleepy man of letters in response to the unvoiced enquiry. "It's a question of best or cheapest. It is physically impossible to produce a first-class four-wheeler, however light, at the same price as you can produce a first-class sidecar outfit. The car which is to compete with the sidecar outfit in price can only do so at the cost of quality. The power unit and the transmission may be sound, but pennies and sixpences are pinched at every nook and corner. The consequence is that when you try the two compared vehicles on the road there is—well, you cannot compare them! In the case of the car you are surrounded by an atmosphere of cheapness which hits you where you live every time you take the wheel. Probably you have some little pride as a motorist, and, to put it plainly, you are a little ashamed of the vehicle. On the luxurious sidecar outfit, on the other hand, you have the secure feeling that the machinery under you is of the best, while the running of the outfit is infinitely preferable."

The Weight Question.

The Novice sucked hard at his pipe. The Manufacturer rejoiced in the sensation that for once popular feeling was with him. But the D.R., hitherto silent, felt it was about time he contradicted someone.

"I do not agree," said the D.R., "that one is necessarily ashamed of one's cheap car. The Journalist is evidently thinking of alien products he has been called upon to test in his dark hours. My Humberette and my Jowett were machines I was always proud of. They cost, so far as casual judgment went, no more to run than the heavy sidecar outfit at £115. Good though it may be, I must say that the present day sidecar *de luxe* is unnecessarily heavy and massive. Why do manufacturers make it so weighty?"

"I will tell you," volunteered the Manufacturer. "In the first place, you demand electric lighting, which in itself is a weighty proposition. You demand everything of the best—a roomy sidecar, windscreen, body box, luggage grid. You want a spare wheel, chain drive, and at least three speeds. Finally, you want enough power to enable you to leave the cheap cars behind, while the sidecar attachments must be sufficiently strong for all conditions—Colonial, mountaineering, and Six Days trials. If you can tell me how you can appreciably lighten present day design, yet retain all this, you will be doing a service to mankind."

The Light Sidecar Outfit in Favour.

"I wouldn't try," responded the D.R. blithely, flinging a match into the fire. "I should realise that I was up against a knotty proposition, and I should try to evolve something different. If I had to choose, I should pick the light car on the lines of the Humberette in preference to the complete sidecar outfit every time. I do not want a Rolls-Royce on three wheels because it is neither a real luxury nor a real economy vehicle. In other words, your heavy sidecar outfit falls between two ideals"—at last the D.R. was in his element—"It falls short of one without attaining the other. It is too good for rough utility, yet no one can call the wearing of overalls a luxury."

"In my opinion," put in the Journalist, "it is not the quantity produced four-wheeler, but machines on the lines of the new Scott Sociable and the Morgan that manufacturers of luxurious sidecar outfits will have to fear. The heavy sidecar outfit consists of two units built up as an inseparable whole. The motor cycle is not practical as a solo mount, and the sidecar, ordinarily speaking, is a permanent fixture. If, then, the sidecar is a permanent fixture, why not build it as such, and give the driver the same comfort and shelter as his passenger enjoys? Why not make a three-wheeled engineering job of it?"

"That, exactly, opens up my point," added the D.R. "The sidecar outfit is essentially a *combination*. Then let it possess the advantages of a combination. What are its recommending features? Lightness, detachability, convenience, and economy. Suppose, now, we divide the purchasing public into three classes—." He paused, that his words might gain their full significance.

"Strong, mild, and medium?" quietly suggested the Novice.

"No!" stated the D.R.

"Mild, bitter, and Scotch?" proposed the Journalist.

Which Demand Predominates?

"No," repeated the ex-soldier, resenting the fact that, in his most serious moods, other people always seemed the opposite side out—"Poor, medium, and rich. The poor man rides a lightweight to and from business. The medium man is the multitude. He is the man who chiefly concerns us. He wants a machine suitable for business or pleasure—something he can ride himself at rock bottom cost, yet on which he can take his wife out during

The Critics. –

week-ends and holidays. *He* is the sidecar man, and let us consider what he wants—not necessarily what he is induced to buy.

"If he is going in for a sidecar outfit," the D.R. went on, "it must be a double-purpose affair if he is to get maximum results from it. Whether it is 3½ h.p., 4 h.p., or 6 h.p. matters little. He wants a machine he can ride solo when necessary, not only because it is cheaper to ride solo than with a sidecar, but because he may have to leave the machine in any passage-way or even in the cycle shed at the office. Then when Saturday comes he wants to be able to attach his sidecar in five minutes and take his wife or his best girl out for a spin."

"I quite agree," the Journalist backed him up. "I think the greatest demand is for the light sidecar attachment. That is the *true* sidecar outfit, and what we want is perfection in quick detachable couplings, instead of which they appear to become more and more complicated."

"Lastly, we come to the comparatively wealthy purchaser," the D.R. pursued. "He goes in for two machines, one a general runabout and business hack, the other for comfortable touring. The heavy sidecar outfit falls short of one without attaining the other, and so he buys the two extremes—the lightweight and the light car."

Both Types Popular.

The Manufacturer had pondered all this in silence, but now he spoke. "All of which is true so far as it goes," he said, "but you have not stuck to the point. You have merely pointed out the possible usefulness of the light, quick detachable outfit. All agree that it is an extremely useful type. There are thousands on the road to-day which cost £60 to £70 complete, but my answer to your argument is that there are also thousands of the heavy *de luxe* patterns. Surely the test of the pudding——? You yourselves know numbers of riders who start off with the comparatively light outfit, but next year or the year after they buy the heavy outfit *de luxe*. This, indeed, is the common order of things, and, while amateurs and journalists can dwell upon their ideals, manufacturers have to stick to the facts of common demand and practice. The sidecar *de luxe* is tried and tested. It has made good. Ye gods! do you imagine manufacturers are asleep over the problems on which their living depends?"

A Stony Path.

The Novice had evidently something to say, for he had been fidgeting and brushing his waistcoat for the last few minutes. "You are all a bit biased in your views," he now announced. "You are purely motor cyclists, whereas I have a light car in addition, so would like to air my views from the point of the light car man in the street. I think that the cheap light car, which may hit the sidecar outfit, has an exceedingly stony path to tread. Firstly it has to overcome the prejudices of men like yourselves—motor cyclists, and—should we say?—sportsmen. It cannot be of the same high workmanship at the price as the sidecar outfit, and therefore you turn your backs to it. Then again, it is not so fast, and so on. You all think the same way; and so, in the past, the cheap four-wheeler has missed your class—the *mechanical* class, and has fallen into the hands of the *unmechanical*, like myself: men who buy from the bill boards, and who would jigger up your luxurious sidecar outfit. Thus the cheap car has got its bad name—not because it is an imperfect proposition, but because it is the one proposition that appeals to the imperfect driver."

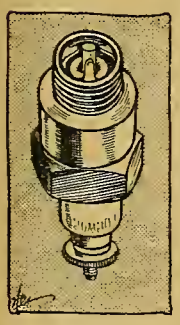
The D.R. congratulated the Novice on having "come out quite sensible."

"But," added the Manufacturer, "we do not get away from the problem of quantity or quality for money. No one doubts that the few cheap light cars we have are excellent value, but the material fact remains—that *it is humanly impossible* to produce a four-wheeler at the same price as one can produce a sidecar outfit. The only four-wheeled specialised product we have does not fill the bill from the point of view of the British manufacturer. From his standpoint it has drawbacks, though it is undoubtedly a marvellous production. It has a two-speed gear—a proposition our buying public would not look at. Its ponderous flabby engine—which renders this gear possible—is heavy on oil and petrol. If this machine had been compelled to attain its first market in England it would never have combated British prejudice. Indeed, we have produced better propositions in England, which have failed, simply through British lack of appreciation for the rough and serviceable."

The Journalist finally summed up the situation by saying that he did not think there was any question of supersedure about it. The light sidecar outfit, the outfit *de luxe*, and the cheap light car would each continue to find its appreciative markets. Each had its place, and so the controversy left him and his companions at the exact spot from which they had started. And there, with apologies, we fear we must leave the reader.

THE LATEST FORWARD PLUG.

WE have received a sample of the latest pattern Forward plug, made by the Forward Motor Co., Summer Row, Birmingham, known as the Type A, which is fitted with the company's patent enamel joint, which has been exclusively used in the Type C plug for some time. This joint is absolutely and permanently gastight, and will not leak under any circumstances. There is no gland nut to work loose, and no asbestos in the construction of the plug to shrink. The plug is of the three-point variety, has substantial electrodes, and should be entirely satisfactory in a motor cycle engine. The central electrode has the threads taken off the upper end so that the terminal screw can be quickly slipped in position or rapidly unscrewed without the danger of dropping off at the end of the thread—a good point.



A new Forward plug fitted with the company's patent enamel joint.

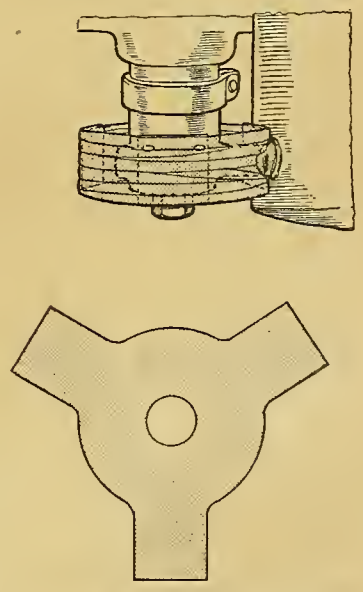
CARBURETTER DRIP CUP.

IN cold weather it is generally necessary to flood the carburetter freely—especially in the case of a two-stroke—ere a start can be made. This generally means that a good deal of fuel drips from the jet air holes, and of course runs to waste, without in any way assisting in the operation of starting up. By means of a very simple fitment, which anyone can make in five minutes, this overflow of fuel can be utilised to assist very materially in starting the engine.

The device, as the writer has fitted it to his own small two-stroke, is made as follows: Obtain a piece of thin flat tin of the requisite size, and cut it into the shape shown in the sketch, so that it represents a three-spoke rimless wheel. Make a hole in the centre of the hub portion just large enough to take the jet screw; then, having fixed the device to the carburetter by means of this screw, bend up the three arms so that they overlap the air holes. Now wrap a few inches of black linen tape round the outside of the three arms, so as to form a cup round and under the air holes.

On flooding the carburetter the overflow is now caught by the cup and totally absorbed by the linen tape, forming, as it were, a pocket of very rich gas as long as evaporation continues. The writer has found that this little fitment, applied to a small two-stroke, in addition to saving petrol, entirely eliminated all starting difficulties in cold weather, and when warm weather comes the tape can simply be cut away.

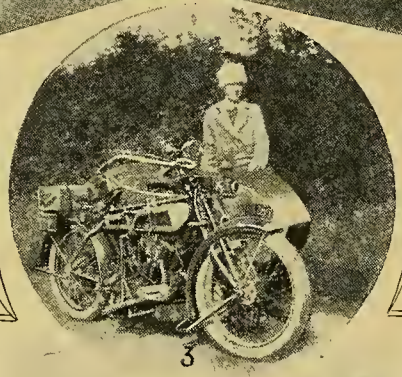
CHINOOK.



A carburetter drip cup, a simple contrivance to effect economy.

A JAUNT TO THE WELSH MOUNTAINS.

Memories of a Ten Days' Tour for £10 'midst the Finest Scenery.



(1) A typical Welsh mountain road—the picture well conveys the desolation and loneliness of these highland districts. (2) Remains of the old Roman wall at Uriconium, near Shrewsbury. (3) The writer and the A.J.S. combination on which the tour was accomplished. (4) One of the most characteristic of the beautiful old half-timbered houses—the Feathers Hotel, Ludlow.

WHEN we decided to take a tour of this much-discussed holiday ground, we thought it wiser to obtain a definite route for reference, and not depend solely on signposts and maps.

We therefore availed ourselves of the services of the A.A. and M.U., who not only supplied us with a route, but also helped us to avoid bad roads and itemised various points of interest.

A certain sunny morning found us dodging the bad traffic and roads out of London. Our route lay through Tring, Aylesbury, Bicester, Middleton Stoney, Bourton-on-the-Hill, down Fish Hill into Broadway. The two last-named villages are exceptionally quaint, and we were tempted to linger and explore, but time did not permit, so we followed the fascinating Vale of Evesham into Pershore.

Minor Troubles.

It was between here and Worcester that we got our first little whisper of trouble. The sidecar inner tube slit, and before we stopped the valve had broken away, so that we were able to appreciate the advantages of a detachable wheel. A picnic tea followed, and a sprint into Worcester gave us time to ramble around the town. Queen Elizabeth's House, Edgar's Tower, and the Cathedral were in turn appreciated.

Next morning we wended our way to Great Witley, Tenbury, and mediæval Ludlow, where we stayed to admire the beautifully wooded and carved front of the Feathers Hotel. We followed the Shrewsbury Road until we reached Brompton, turning left at the "Bluebell Inn" for Sarn Kerry and Newtown. We were always uncertain when we actually entered Wales, but the scenery throughout was ever-enticing, the high misty hills drawing nearer and nearer.

The afternoon seemed to be fated to be one of trouble—of a minor order. We had rain galore, a choked oil pump, followed by the plugs oiling up, the results of efforts to avoid the worse evil of seizure. Then a high-tension wire fouled the exhaust pipe, causing a short circuit, and, to crown all, one cylinder cut out, and the dusk found us in a very dreary little village. Water seemed to be everywhere, and its presence in both the magneto and the carburetter had put us out of action. However, persistence on the part of the driver eventually settled the trouble, and we continued through the semi-darkness and pouring rain to Cemmaes Road, where we found accommodation.

It rained all night, but morning sunshine welcomed us to the road once more.

A Welsh Market Day.

Leaving Cemmaes Road, we ran amidst scenery more typically Welsh, and Machynlleth, the next town, we found particularly interesting, as it was market day. The streets were full of Welsh ponies, cattle, and sheep, which apparently roamed about the place at will.

A Jaunt to the Welsh Mountains.—

Aberdovey, Arthog, Dolgelly to Barmouth showed us more wild and beautiful scenery. Barmouth, the finish of the day's run, did not strike us very favourably. It was charmingly situated, but the town itself was too suggestive of trippers. The coast road from here to Harlech was certainly interesting, but the gradients and a forty-knot nor'-wester called for second gear most of the way. Amidst mediæval castle and rough stone houses, the presence of a modern motor cycle seemed to be an anachronism. After Harlech there seemed little of interest until we turned left at Maentwrog for Penrhyn and Tremadoc. Then the gorgeous Snowdon scenery unfolded itself gradually.

Lunch by the River.

Perhaps our jolliest lunch was on the banks of the River Glaslyn. It is almost impossible to describe adequately the magnificence of the scenery on the road to Beddgelert. The gem is undoubtedly Pont-Aberglaslyn. The quaint old bridge spanning the turbulent waters, the lovely wooded hills on either side, made a most impressive picture. Nestling in a valley, and surrounded by vast mountains, their bleakness softened by the afternoon light, came the village of Beddgelert. Here we made a pilgrimage to see Gelert's grave, but it was somewhat disappointing, as we expected to see something more than just a crude piece of stone.

Llanberis and Snowdon.

An easy run from the village, beside Lyn Dinas and Lyn Gwynant, led to the long pull up the Gwynant Pass to Pen-y-Gwryd, with the valley lying far below on the left and the Llwydd and Crib Coch shoulders of Snowdon beyond it, forming a glorious mountain panorama. We turned sharp to the left at the hotel, and, still climbing, soon reached the top of the Llanberis Pass. Here the rain made us appreciate the shelter given by a huge slab of rock which had slid from the mountain side, forming a natural cave. We arrived at Llanberis in time to see the falls before night. The next day was spent in climbing Snowdon, which, with its customary elusiveness, hid its head in the mist all the time we were on the top and until we were back below the snow line. Leaving Llanberis in the evening, we climbed back up the pass to Pen-y-Gwryd, and on through the straggling village of Capel Curig, beloved of artists, to Bettws-y-Coed before lighting up. This village is undoubtedly the Mecca of all tourists in Wales, and we spent an interesting day exploring. Swallow Falls, Miners' Bridge, and Pandy Mill were duly admired. After the bleakness of Snowdon the verdure of this beautiful village was restful and refreshing. The following day we ran out to Lake Ogwen to explore its surroundings, of which we had heard so much. We left the sidecar by the inn, and walked by a winding track across the bog, to see what is probably one of the most impressive sights in Wales—Llyn Idwal, surrounded by lofty mountains. From here we had a feverish scramble over rocks and stones right up to the gloomy yawning base of the cleft in the rocks known as Twll-du (the Devil's Kitchen). More than one fatal accident has overtaken the zealous climber who has tried to scale its slippery sides. That night found us peacefully reviewing Borrow's beloved Llangollen.

From 6 h.p. Sidecar to 1 h.p. Barge.

The next day we changed our normal mode of transport for a 1 h.p. barge, which takes one out to Valle Crucis Abbey. This interesting ruin, dating from the eleventh century, contains a stone coffin of one of the Knight Templars. Another relic of special interest is an old well, into which you may throw your pennies and wish, on the principle of heads you win, tails you lose. We shrewdly suspect that the winner every time was the lawful denizen who periodically collects the pennies.

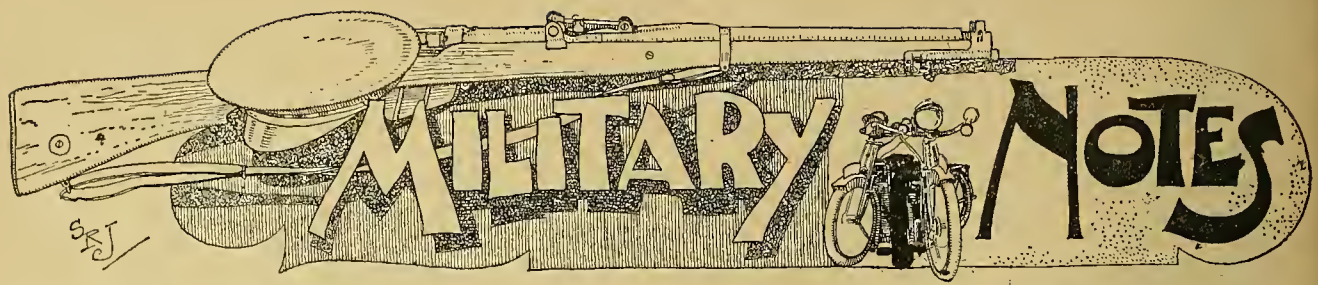
The old wooden trestle bridge across the Afon Glaslyn at Beddgelert. This district abounds with magnificent mountain scenery.

From Llangollen to Shrewsbury the scenery became more ordinary—in fact, the terrible condition of the roads was more enforced upon us than the surroundings. On Sunday morning we made for Uriconium. These little known remains of a Roman city held us entranced. The most interesting relics were the baths, and we lingered quite a time. After taking a photograph of the partly demolished wall, we made for home *via* Stratford-on-Avon.

Summary.

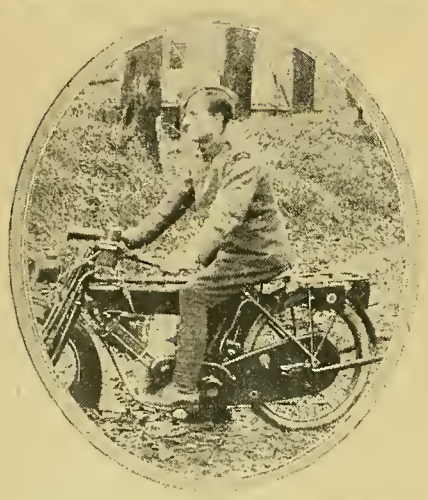
Time, ten days; total mileage, 550; consumption, 55 m.p.g., half petrol, half white spirit; machine, 6 h.p. A.J.S. Our total expenditure was under £10. Needless to say that picnicking enabled us to have a more dainty and varied *menu*, and at the same time represented a saving on hotel expenses.

"THE PASSENGER."



D.R. KILLED.

WE are advised by his relatives of the death of Sec.-A.M. L. L. Bailey, R.F.C., formerly of Widnes, who was accidentally killed whilst carrying despatches in France. Bailey joined



2nd-A.M. L. L. Bailey, R.F.C., accidentally killed whilst carrying despatches in France.

up in May, 1916, and has ridden a good deal in France. He was buried in Bailleul Cemetery.

MOTOR CYCLIST ATTACKS ZEPPELINS.

CAPT. J. W. WOODHOUSE, M.C., who, we mentioned, has recently had a bar added to the Military Cross, received this distinction "for conspicuous gallantry on three occasions in attacking Zeppelin airships over land and sea."

APPOINTED NAVAL CHAPLAIN.

THE Rev. P. W. Bischoff, formerly a member of the committee of the A.C.U., who interested himself very keenly in the use of motor cycles for military purposes long before the war broke out, and who competed in several Scottish motor cycle trials, has been appointed an acting chaplain for temporary service in the Royal Navy.

BELGIAN DECORATION FOR MOTOR CYCLIST.

WE are happy to be able to state that Temporary Lieutenant D. S. Baddeley, A.S.C., formerly one of the leading lights of the Motor Cycling Club, has been created by H.M. the King of the Belgians a Chevalier de l'Ordre de la Couronne.

A MEMBER OF THE BLACK CAT TANK.

WE regret to announce that a member of a famous "Tank" crew passed away during the performance of an operation. The man in question is Gnr. W. W. Atkins, who had been ailing with a cold for a few days previously, and had, in fact, only just rejoined after being discharged from hospital as the result of a wound he received whilst getting out of his "Tank" after a cruise in the German lines. Gnr. Atkins formed one of the crew of the first heavy armoured cars to cross the German lines, his commander being Lt. H. C. F. Drader, M.C., who adopted the famous black kitten—now practically cat size—as a mascot. Gnr. Atkins was formerly employed by Mr. W. Brandish, motor agent, Foleshill Road, Coventry, and was recruited through *The Motor Cycle* for the Motor Machine Gun Service, being subsequently transferred.

Gnr. W. W. Atkins and the crew of the now famous Black Cat Tank. This Tank is to be seen in the great Ancre film, the Black Cat figuring prominently in the picture.

A CHAT WITH AN AIRMAN MOTOR CYCLIST.

THE other day we had the pleasure of a chat with Capt. Vernon Busby, R.F.C., who was formerly a despatch rider with the Royal Engineers, subsequently receiving a commission in that

Capt. Vernon Busby, R.F.C.

section and then a transfer to the R.F.C. As may be imagined, Capt. Busby has had a very varied experience. During his sojourn in France as an airman he had opportunities of flying and testing nearly all the different makes of aeroplanes and engines used in the British Army. He remarked upon the strong attraction that the Flying Corps had proved to old motor cyclists, and mentioned a large number of men with whom he had come in contact. He was at the depot, and met personally four greatly respected motor cyclists who have lost their lives for their country whilst flying, notably Sec.-Lt. O. C. Godfrey, Sec.-Lt. John Gibson, Sec.-Lt. G. L. Columb, and Sec.-Lt. R. H. Edwards. For some weeks past Capt. Busby has been home on sick leave, having been troubled with sciatica, but hopes shortly to rejoin his squadron. He is full of enthusiasm for the possibilities of the motor cycle and light car trades in particular after the war.

A DISTINGUISHED OFFICER.

COL. E. D. SWINTON, D.S.O., has been created a C.B. He was one of the men responsible for the development of the "Tanks." Col. Swinton is a well-known author, who wrote under the name of "Old Luk Oie," and was also the original "Eye Witness" to the British troops in France. It is not generally known that he acted as observer on a German car in the Prince Henry Tour.

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When you see a motor cycle branded with this trade mark, it's the Ariel—by achievements the machine of supreme and unchallenged reliability.

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IT is against the National interest to purchase imported Tyres in War time. All the money is needed in the Country.

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THE ARBUTHNOT TROPHY.

THE statuette of the late Rear-Admiral Sir Robert Keith Arbuthnot, Bt., K.C.B., M.V.O., was the outcome of a suggestion of a member of the staff of this journal that the memory of this gallant motor cyclist should be perpetuated by means of a trophy to be competed for annually by officers of His Majesty's Navy.

Many subscriptions were received for the fund, which was instituted to purchase the trophy and bear the expenses of a competition of this kind, and motor cyclists from all parts of the globe, and in all stations of life, sent in their contributions.

The work of executing the statuette was entrusted to that well-known sculptor, Lady Scott, who was a pupil of the eminent French sculptor M. Rodin, and widow of the late Captain Robert Falkland Scott. Though Lady Scott had never met Sir Robert Arbuthnot she was able to get a very fair likeness of his features, and altogether has accomplished her task most successfully.

The Arbuthnot Trophy.

It will be noticed that the late Admiral is garbed in his motor cycling attire, and is wearing the poncho which was such a familiar object in the principal competitions in which he competed.

IN MEMORY OF A GALLANT SAILOR AND GREAT MOTOR CYCLIST.

AN A.C.U. RESOLUTION.

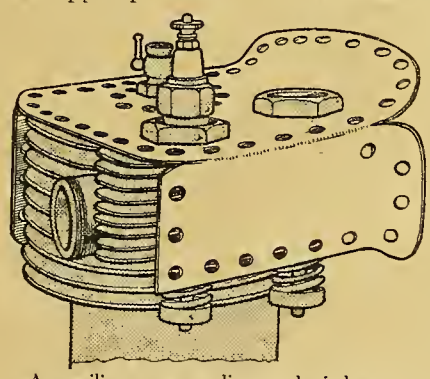
AT a meeting of the A.C.U held on the 15th inst. the following resolution of the Competitions Committee was adopted: "That in all open competitions promoted by the Union other than those of an international character no motor cycle having any part of German, Austrian, Bulgarian, or Turkish origin or manufacture, and no entrant of such nationality shall be eligible to compete. This shall not apply to a motor cycle manufactured before August, 1914." New members were elected, and the Kirkee M.C., India, was affiliated to the Union.

AN AUXILIARY COPPER RADIATOR.

How a Rider can keep his Engine Cool.

FROM time to time *The Motor Cycle* has given descriptions of various auxiliary radiators evolved by practical riders—the Harcourt people being, I suppose, the pioneers in this line of invention. Later Capt. Lindsay described a copper plate fitment he had attached to his Norton, and it was this idea that led the writer to experiment with similar fitments.

Copper radiators are by no means so ugly as those of aluminium—indeed, when decently burnished, they rather add to the good appearance of the power unit Artistic perforations, though theoretically wrong, add the finishing touch as regards appearances, while if desired the surface of the copper can be kept clean and bright. But what is more to the point, better running can be obtained and oil saved by the judicious use of these fitments, while on some machines they may add months to the life of the sparking plug.



An auxiliary copper radiator and wind scoop with ample and effective cooling surface.

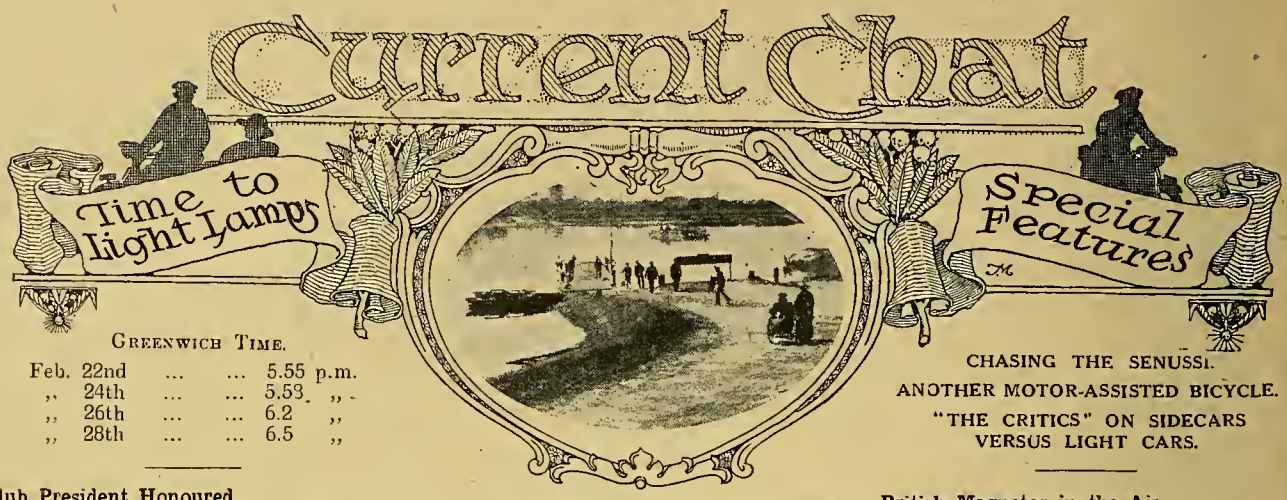
The accompanying illustration explains a type of auxiliary radiator the writer has recently carried into practice. Its primary object is to intercept and dissipate the heat passing from the cylinder to those massive and heat-retaining chunks of metal, the valve caps, sparking plug, and compression tap, while its secondary purpose is to act as an air scoop, catching the current of air and concentrating it upon the cylinder head.

A sheet of copper of the required measurements is cut into the shape shown in the sketch, and cut to take the valve caps and the compression tap. The exact position of the holes can be ascertained by careful measurement, but a safer plan is to cut out the hole for the compression tap in the centre of the plate, and, having temporarily attached the sheet to the cylinder, mark out the respective positions of the two valve cap holes by tapping lightly with a hammer (having, of course, first removed the caps). The radiator can then be drilled, if desired, the ring of holes round the top being the only ones that answer any purpose beyond ornamentation, and finally the sheet is bent into the desired curves as indicated by the accompanying drawing. The copper and asbestos joint rings lie between the cylinder and the radiator, and it will be noticed that all the edges of the fitment that meet the rush of air are curved to concentrate the cooling draught on the cylinder.

This radiator dissipates a considerable amount of heat and also acts as an air scoop. With the machine stationary and the engine running, it would perhaps tend to imprison a certain amount of hot air round the cylinder, but this point can, I think, be neglected, as the ring of air holes permits the hot air to escape from the top of the radiator.

CHINOOK.

Current Chat



GREENWICH TIME.

Feb.	22nd	... ...	5.55 p.m.
,,	24th	... ...	5.53 ,,
,,	26th	... ...	6.2 ,,
,,	28th	... ...	6.5 ,,

CHASING THE SENUSSI.

ANOTHER MOTOR-ASSISTED BICYCLE.

"THE CRITICS" ON SIDECARS VERSUS LIGHT CARS.

Club President Honoured.

Mr. George A. Touche, M.P., who received a knighthood in the last honours list, is president of the Finsbury Park Cycling and Motor Cycling Club.

Explosion Victim's Progress.

T. J. Ross, captain of the Woolwich Club and Triumph agent, who received injury through the East End explosion, is making good progress. A member of the Woolwich Club whose home was wrecked by the explosion is now installed in new quarters—in another district.

Clynos after the War.

From a paragraph in the last issue, several readers have been led to think that Mr. Hugh Gibson, the erstwhile competition rider, has severed his connection with the Clyno Co. This is not so; and the gifted rider is very much employed by the above-named company in keeping pace with ever-increasing Government orders for sidecars. Mr. Gibson is looking forward to visiting Clyno agents with the post-war Clyno sidecar model when present pressure relaxes.

A Brave Motor Cyclist.

It may be remembered that, on the occasion of the last Zeppelin raid over London, the fact of one of the two Zeppelins having come down in Essex afterwards was announced by a young Essex farmer, Mr. Albert Wright, who set off on his motor bicycle to inform the military authorities. While on the way he collided with a car, was severely injured, and eventually lost his life. It was announced last Wednesday that Mr. John Wright, the father of Mr. Albert Wright, the brave motor cyclist referred to, has received a grant of £150 from the War Office.

A Wintry Ride and Economy.

Two hundred miles to the West of England and back during the past week-end served to give us a further example of the economy of motor cycling. The journey was from Coventry, *viâ* Birmingham, Evesham, Cheltenham, and Gloucester, to Bristol, the return being over the same route to Evesham, thence through Bidford, Stratford, Warwick, and Kenilworth to Coventry. The conditions were not ideal, frozen roads being general, with hard snow around and south of Cheltenham. The down journey was pleasant, by reason of continuous sunshine, but the return was a cold, very cold, affair. The 3 h.p. Enfield gave no trouble, and simply romped along, the first stop after Birmingham on the forward journey being at Berkeley Road, seventy-five miles. An excellent average speed was maintained throughout. Road surfaces were hard to judge, but the last fifteen miles to Bristol are shockingly mutilated by motor 'bus traffic. The Warwick, Kenilworth, to Coventry section was also very bad.

The striking point of the trip lies on the score of expense. The Enfield is running at 100 m.p.g., and used almost exactly two gallons. At 3s. 4d. per gallon, this amounts to, say, 7s., plus 6d. for lubricating oil. Total running cost, 7s. 6d. The return rail fare is 27s. 6d. under present conditions. A clear saving of £1 is indeed a consideration in these days. Moreover, the time occupied was very little more than the quickest railway connection, with the advantages of fresh air and freedom thrown in.

War Time Developments.

As we have intimated from time to time, engineers have learnt more by the results of the war than would have been brought about by ten years of ordinary development. Things will move quickly when peace conditions return, and we can look forward to some big changes, especially in the air-cooled engine. The almost inconceivably rapid progress of the aero engine has opened up new fields as regards cylinder castings, etc., and one is tempted to think that overheating, at any rate, will be a thing of the past. Valves, too, have been improved, and the highly perfected valve of to-morrow, working in its cool running cylinder, will probably last indefinitely without attention.

Will Silence Follow?

But the aeroplane is teaching us nothing as regards silencing—a point on which there is ample room for improvement. Silencing the exhaust is a simple matter, but valve clatter presents a more knotty problem, and, unfortunately, the modern air-cooled cylinder, with its fine, deep, radiating fins, tends very much to enhance the ring of the valves.

British Magnetos in the Air.

It is officially announced that our airmen who have destroyed Zeppelins all used British magnetos designed in Britain and made by British labour in all-British factories.

Speeding Up.

Sidney George writes from France: "There is a little matter you might put right for me. In *The Motor Cycle* of February 8th you have me down as holding a high-speed record at nearly 93 m.p.h. Now this stands at 93.48 m.p.h."

Are Imports Prohibited?—No!

In March last imports of foreign-made motor cars and motor cycles were prohibited by the British Government, but during January (*i.e.*, ten months after the Order) no fewer than 201 motor cycles, valued with parts at £16,218, were allowed into this country. Why?

"The Critics."

Our new series of articles entitled "The Critics" will, we think, be keenly followed by many of our readers, as the object of these articles is to present all sides of the various and much discussed problems that at times perplex not only the novice but also the practical rider. The interest of the articles is added to by the fact that each is the result of an actual discussion, and the characters are real, living beings.

The Cheery Side.

We have received many bitter comments from readers on the stopping of petrol supplies for private motorists, but, disappointing though it may be, we must endeavour to look on the just and cheery side. If the war is to be prosecuted more vigorously and the danger of shortage in the Army avoided by these precautionary measures, we must accept the inevitable with a spirit of patriotism.

An Expensive Form of Economy.

A Portsea vicar was fined £2 on Thursday last for driving a motor cycle at 31¼ m.p.h. He wrote to the Bench explaining that he had to go to London on business for his brother in Mesopotamia, and he was economising by travelling by road instead of by rail. The journey of fifty miles took him five hours, and it was his first offence in fourteen years.

The National War Funds.

At the week-end the principal war funds stood as follow :

The Prince of Wales's Fund (distributed £3,539,719)	£6,032,027	0	0
British Red Cross Fund	6,190,753	0	0
Tobacco Fund	125,596	0	0

Marriage of Lt. H. C. Mills, R.N.V.R.

On the occasion of a smoking concert organised in the honour of Lt. H. C. Mills, R.N V.R., a presentation was made to his *fiancée*, Miss Dorothy Wilding, by Flight-Commander Owen, R.N. The marriage took place on the 10th inst.

Somewhat Vague.

A correspondent asks, without giving the original price of his machine, power, mileage, etc., what he ought to allow for depreciation with petrol at 3s. 6d. per gallon! We should say about 4d. or 9d. In other words, the answer is eleven.

The Year of Origin.

It has been brought to our notice on several occasions of late that advertisers of second-hand machines have wrongly stated the year of origin. In more than one instance a buyer has complained to us that he has purchased a machine purported to be a certain year's production, but which, on enquiry, proved to have been of a pattern in vogue the year previously. Motor cyclists would do well to be on their guard. *The Motor Cycle* Deposit System, whereby machines may be obtained on approval, was instituted to safeguard advertisers from all pitfalls of this nature.

The Motor Transport Volunteers.

A meeting, at which the Lord Mayor of London, Sir William Dunn, presided, was held at the Mansion House early last week in support of the Motor Transport Volunteers. The principal speakers were Gen. Sir Horace Smith-Dorrien, K.C.B., D.S.O., Lt.-Gen. Sir Francis Lloyd, K.C.B., C.V.O., D.S.O. (General Officer Commanding the London district), and Sir John Lister-Kaye (president of the corps).

The Motor Transport Volunteers, which are allied to the National Motor Volunteers, perform their duties between the hours of midnight and 7 a.m., their work consisting of meeting troop trains and conveying soldiers arriving by them to their destinations in London or from one terminus to another.

The speakers referred at great length to the extraordinarily valuable work carried out by this corps, which has greatly assisted troops in keeping fit, and has also helped to shield them from the many dangers which beset them on their arrival in London.

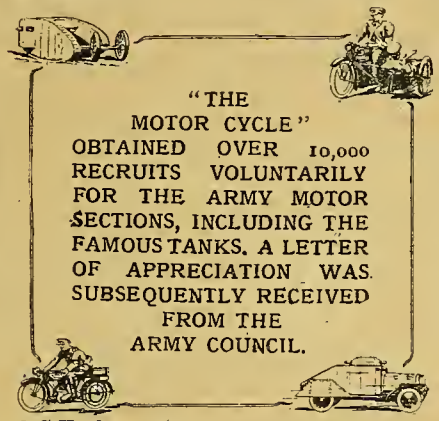
The corps is in need of men, money, and motor cars (heavy and light), and it would be extremely glad to receive the assistance of motor cyclists driving side-car combinations who could help in the work of transporting the troops, especially in cases where only one man requires to go to one particular place, and also acting as despatch riders between the various railway stations. If sufficient men are obtained, it is hoped that members of the corps would be required to undertake duty only one night in six, while petrol is supplied free for this service. Applications should be made to the Hon. Sec., Motor Transport Volunteers, 11-12, Silver Street, London, E.C.

Competition Rider's New Post.

Mr. F. W. Southern, the representative of Messrs. J. Marston, Ltd., and the successful competition rider of Sunbeam machines, has been appointed by the Ministry of Munitions (M.W.S. dept.) at Leicester to take charge of the transport section there. Mr. Southern, who is a well-known motor cyclist, has been manager of the Sunbeam depot for the past two years.

Main Road Impressions.

Probably the most obnoxious man on the road is he who delights in overtaking a low-powered machine and then refusing either to get away or to allow the vanquished one to pass. Sometimes he is out solely on idle pleasure, while the man on the low-powered machine is generally out to get there with as little discomfort as possible, and is in no mood to be impressed by his victor's powers of acceleration.


"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

A.C.U. Accounts.

The accounts of the A.C.U. for the year 1916 showed a surplus of £137 15s 1d. on the Revenue Account, which, under present conditions, may be regarded as favourable.

Lightweights in America.

The trend of the motor cycle market in America is illustrated in a recent issue of an American contemporary *Motor Cycling and Bicycling*, by the amount of space devoted to the subject of lightweight machines. Evidently America has wakened to the fact that huge road-eating twins do not represent the sole demand of an educated public, for in the issue referred to eleven new American lightweights, ranging in price from the equivalent to £7 to £36, are illustrated and described. Five of these are more by way of being auxiliary cycle attachments than genuine motor cycles, and, with one or two exceptions, the remainder appear somewhat antiquated and quaint.

Educating the Masses.

But the American public has yet to be educated to the lightweight. To-day, "motor cycle salesmanship usually consists in selling heavyweight machines to people who ask for them," remarks our U.S.A contemporary. "This is bar tender salesmanship. No one ever accused a bar tender of being a salesman. The latest demand is for lightweight machines." This, says *Motor Cycling and Bicycling*, is "latent" demand, as distinct from "positive" demand.

Refund of Taxes Paid.

There is hope that the suggestion in the leading article in our last issue may have effect. In that article we recommended a refund of a proportionate amount of the tax paid in January, seeing that many motor vehicles may stand idle in the summer for want of petrol. A question in the House of Commons last week elicited a reply from the Chancellor of the Exchequer to the effect that the suggestion would be considered. If only the motor organisations would move in the matter *collectively* it is quite probable that a certain allotment of petrol would be forthcoming, or, if that is found impossible, a refund of a portion of the taxes paid.

How Many Motor Cycles?

A contemporary gives the number of motor cycles registered in the United Kingdom as 160,290 in 1916 and 147,904 in 1915. The 1916 figures were made up as follow :

England and Wales ...	131,805
Scotland	19,147
Ireland	9,338

Petrol Restrictions and Road Licences.

It is intimated that the committee of the Automobile Association has asked the Chancellor of the Exchequer to receive a deputation on the matter above named. The principal point is that, whilst loyally accepting the decision of the Government in the present critical conditions, it is considered unreasonable that licence duties should be charged for twelve months for cars which can be used only for four months in the year, and that an equitable adjustment is desired.

Conditions for the Arbuthnot Trophy.

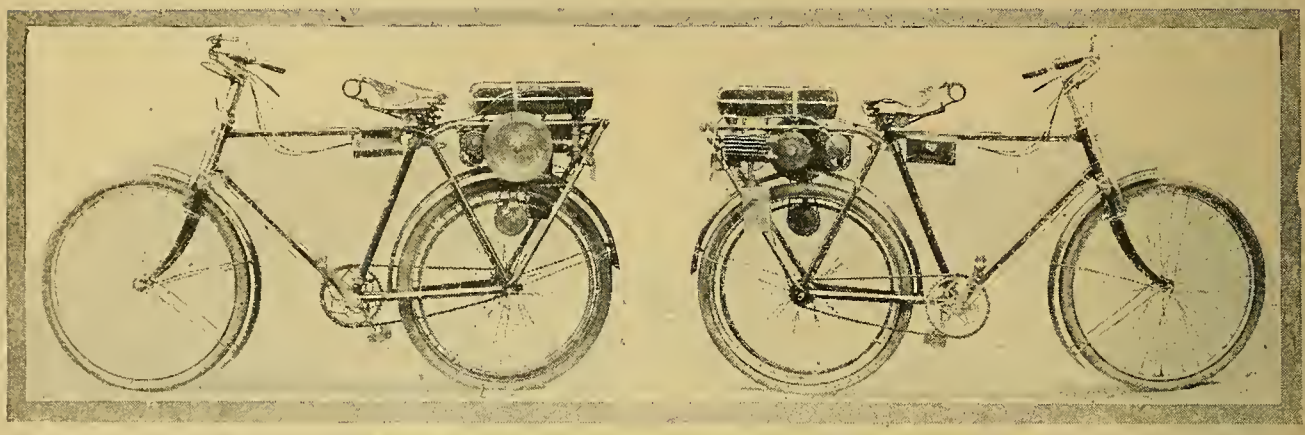
The Competitions Committee of the Auto Cycle Union has decided, in connection with the Arbuthnot Trophy, that under the present conditions it is inadvisable to formulate any definite conditions for the Arbuthnot Trophy Annual Competition. The unexpected balance of the Trophy Fund, amounting approximately to £100, has accordingly been invested in War Loan, to be spent ultimately in the provision of awards. A replica of the trophy is to be presented to H.M.S. *Orion*.

Don't Over-oil.

We find that small two-stroke machines, used only for very short journeys, such as running in and out from business—a matter of two miles at a time—require an absolute minimum of oil. This is due to the fact that the engine never really becomes warmed up, as on a long journey, when not only the cylinder and the piston, but the crank and connecting rod, and indeed the whole interior of the engine, become hot enough to cause evaporation and burning of the lubricant. On short journeys practically no evaporation takes place, and, therefore, the oil feed should be sparingly adjusted. One rider informs us that he has used only a pint of oil in six months' daily riding. This, we think, is running it rather thin; but we find from personal experience that one particular two-stroke requires only about a tablespoonful of oil for every ninety miles, made up of two-mile runs Beware, therefore, of over-oiling.

ANOTHER MOTOR-ASSISTED BICYCLE.

THE ZEPHYR MOTOR ATTACHMENT FOR PEDAL CYCLES.

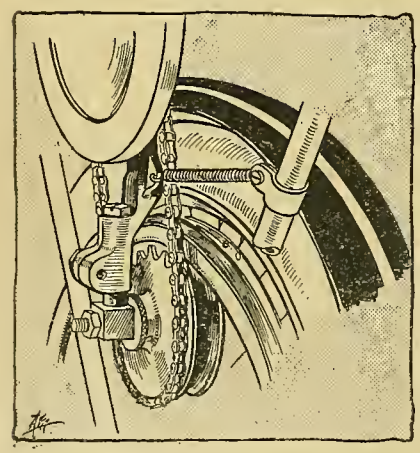


The Zephyr motor attachment fitted to a standard roadster pedal bicycle.

IT was just over a year ago, in the issue of November 18th, 1915, page 489, that we described an attachment handled by the London and Westminster Industrial Syndicate, Ltd., 8, Victoria Street, London, S.W., designed to fit to the rear of an ordinary pedal cycle. In this article full details of the preliminary model were given.

Since that date, owing to the war, the Syndicate, of course, has had no opportunity of making any arrangements with regard to the selling of the device; but, from the mechanical point of view, it has not been idle, and has now brought out an improved model.

The attachment, which now bears the name of the Zephyr, consists of a two-stroke, single-cylinder engine, carried horizontally on a special form of carrier attached to the rear of the cycle. This carrier resembles, to some extent, an ordinary luggage grid; but, whereas the preliminary model had the engine bolted to a platform which was bolted in turn to the carrier, the new model has been considerably simplified in design, the engine being bolted direct to the carrier itself.



The Zephyr transmission, demonstrating the method of carrying the friction wheel on the rocking arm.

How the Engine is Attached.

This carrier consists merely of two parallel tubes attached to a lug clipped round the top of the seat tube of the bicycle. It is strengthened by means of transverse members or brackets, which take the form of clips, and serve to join the two horizontal and parallel members. The cylinder head casting is made in such a form that it is bolted on to one of these brackets, while another of the brackets serves as a support for the crank case. These brackets are also used as an attachment for the petrol tank, which is carried on the top of the carrier, and will be lower in the final model than is shown in the accompanying photograph.

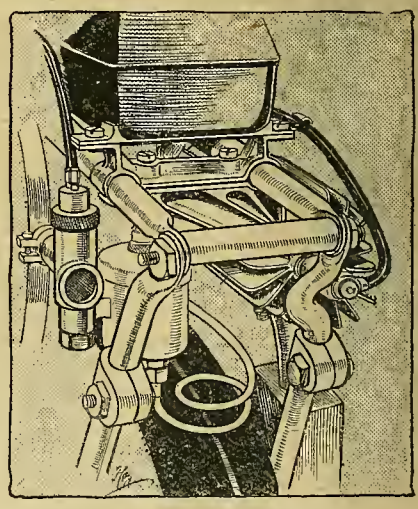
The engine has a bore and stroke of 51 mm. × 51 mm. It does not present any very special features except that the transfer port is provided with a neat cover, which can be removed for cleaning purposes. The side of the crank case may also be removed without difficulty. It has not been definitely decided that a two-stroke engine will be adopted finally, and it is quite possible that a four-stroke engine will be fitted to the first models to be manufactured.

On the mainshaft there are two sprockets, one serving to drive the magneto, which is carried in an inverted position at the forward end of the carrier, while from the other a chain runs to the driving pulley. The carrier is supported by long tubes extending to the rear hub of the bicycle, which are made telescopic, so that the whole unit may be raised or lowered if desired.

The Transmission.

The general interest of the machine, however, lies in the transmission, which is effected by means of a sprocket mounted on the engine-shaft, from which a chain runs to another sprocket mounted on an arm, the upper end of which has a phosphor-bronze bearing moving on a steel sleeve fixed over the boss of the crank case. This lower sprocket is mounted on a spindle, on the other end of which there is a fibre wheel engaging with the under side of the belt rim spoked on to the wheel of the bicycle. This sprocket is loose on its spindle, and is secured merely by friction, being held by one fibre ring and two locking rings, so that just sufficient slip is allowed to absorb any abnormal shocks. When the rocking arm hangs down there is no contact between the fibre pulley and the belt rim, consequently this is the free engine position.

The engine is started by pulling the rocking arm forward by means of a Bowden wire on the handle-bar of the bicycle. This causes the friction wheel to come in contact with the belt rim, so that when the back wheel is pedalled the engine is driven through the agency of the friction wheel and chain. As soon, however, as the engine fires, owing to the direction of rotation of the friction wheel, no power is transmitted, the tendency being to disengage itself; but, on the Bowden lever being released, the friction wheel frees itself, and the "take-



Method of attaching the engine and the tank to the carrier.

Another Motor-assisted Bicycle.—

off" spring attached to the arm allows the latter to move towards the rear. As soon as this happens there is a tendency for the friction wheel to run towards the rear of the bicycle against the pulley, and by this means the drive is effected, there being in consequence a certain jamming action which provides just sufficient drive without any danger of slipping.

Some Claims.

The consulting engineer to the Syndicate, Mr. H. B. Molesworth, M.Inst.C.E., one of the editors of "Molesworth's Handbook of Engineering Formulæ," declares that this method of transmission is quite novel, and puts forward several claims in its favour. He points out that when no power is exerted there is no pressure on the contact surfaces, that the necessary pressure is obtained automatically without the use of springs, weights, levers, or other appliances The tangential force causing contact pressure is quite small, and the force required to release contact and free the engine is also quite small, and even this small force can be eliminated by slowing the engine; while, owing to the automatic incidence of pressure on the contact surfaces, any slight inaccuracies of parallelism, or in the truth of the driving rim, cause corresponding adjustments of the mechanism, thus obviating all shocks and wear which would be unavoidable in any other method of transmission.

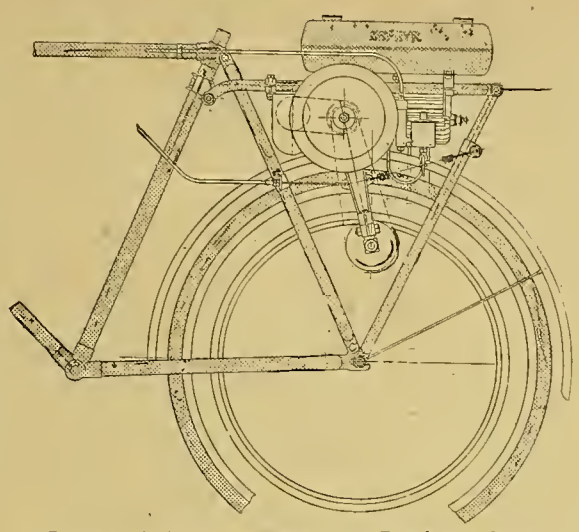


Diagram of the motor equipment. Details are shown of the transmission system and manner of attaching carrier to seat tube.

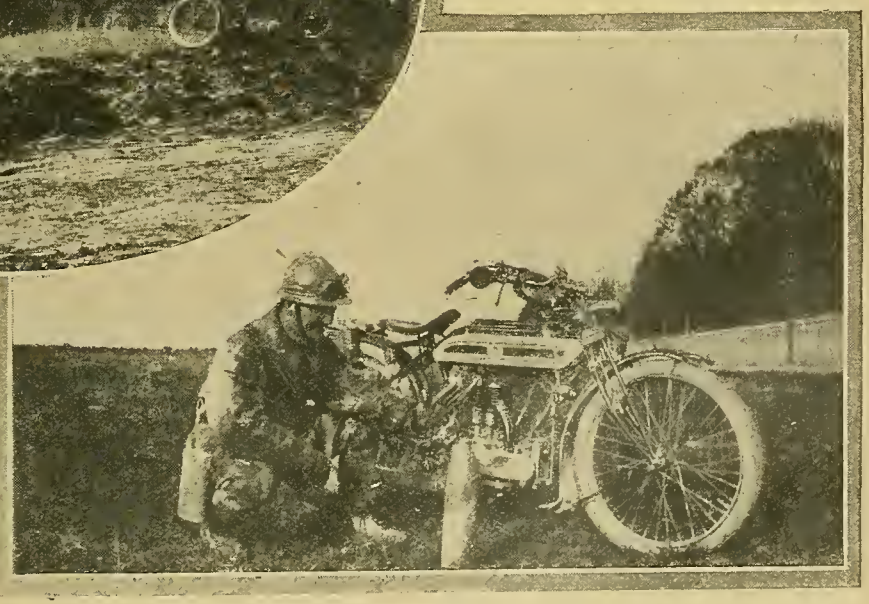
It must be distinctly understood that the "take-off" spring to which we have referred has no other function than to pull against the Bowden wire, the drive being effected entirely by the "rolling-in" action of which we have already made mention, and which takes place as soon as there is sufficient contact between the surfaces.

We have had opportunities of driving both the two-stroke and four-stroke models; but, unfortunately, circumstances prevented us from taking an extended run, which is a pleasure to which we shall look forward at no very distant date.

The Zephyr all on weighs 60 lb., the weight of the unit being 40 lb. Undoubtedly, when the war is over, an attachment of this kind will do much missionary work in converting the pedal cyclist from his humanly-propelled mount to one which is mechanically propelled. Naturally, at the present time it is impossible to get the attachment manufactured, but we understand that arrangements will be made to manufacture in quantities as soon as circumstances permit.

LIGHT CAR MATTERS.

AMONG the leading features of yesterday's issue of our sister journal, *The Light Car*, is an article, "Forty Thousand Miles on a Light Car," written by a leading competition rider now in the Royal Flying Corps. In this article many useful hints are embodied. "Suggestions in Chassis Design," "The Word Fuselage" (describing the derivation of the term), "Red Cross Work in the Midlands," "A Winter's Drive," are among other features included in an attractive issue.



WITH A DESPATCH RIDER ON THE FRENCH FRONT.

(Top) A good idea of the size of big shell holes will be gathered from the photograph, which also depicts the shocking roads the despatch riders have to traverse.

(Bottom) A despatch rider in the Champagne sector and an unexploded Hun shell. It will be noticed that the motor cycle is an ordinary standard model Triumph. (*Passed for publication by the French War Minister.*)

THE VICTORY LOAN.

The Most Complete List of Subscriptions of the Motor and Allied Trades.

	Total. £		New Money. £
A.A. & M.U.	77,000	....	—
Allday & Onions	21,000	....	21,000
Alfred Herbert, Ltd.	103,236	....	78,000
Auto Machinery Co., Ltd.	6,100	....	6,100
Arundel & Co., Stockport	20,000	....	20,000
Auto-Carriers	10,000	....	10,000
,, Directors and Staff	8,000	....	8,000
Anglo-American Oil Co., and Employees	510,000	....	310,000
Austin, Mrs. Herbert (Austin Motor Co.)	5,000	....	5,000
Bluemel Bros., Ltd	40,000	....	35,000
Bradbury & Co., Ltd.	10,000	....	10,000
J. B. Brooks & Co., Ltd.	25,000	....	10,000
B.S.A. Co., Ltd., and Daimler Co., Ltd., jointly	500,000	....	430,000
Bretts' Stamping Co., Ltd.	10,000	....	10,000
British Chuck & Piston Ring Co., Ltd.	2,000	....	2,000
Brown Bros., Ltd.	20,000	....	20,000
J. Bourne & Son	3,000	....	1,400
British Westinghouse Co., Ltd.	60,000	....	50,000
Calcott Bros., Ltd.	10,000	....	10,000
Coventry Chain Co., Ltd.	25,000	....	25,000
Coventry Repetition Co., Ltd.	10,000	....	10,000
Coventry Aluminium & Refining Co.	500	....	500
Calthorpe Motor Co.	30,000	....	10,000
Directors of above:			
W. Hill	5,000	....	5,000
H. Joyce	10,000	....	10,000
G. W. Hands	10,300	....	10,000
L. Antweiler	1,000	....	1,000
H. C. Church	7,000	....	3,500
Crossley's Motors & Crossley Bros. (jointly)	70,000	....	70,000
Chater-Lea, Ltd., Employees	2,000	....	2,000
Components, Ltd.	20,000	....	20,000
Douglas Bros.	200,000	....	200,000
Dunlop Rubber Co., Ltd.	350,000	....	350,000
Enfield Cycle Co., Ltd.	20,000	....	5,000
Ford Motor Co. (England), Ltd.	27,500	....	13,500
Ford Motor Co.	100,000	....	100,000
,, on behalf of Employees	20,000	....	20,000
A. W. Gamage, Ltd.	10,500	....	10,000
Heaths' Garage, Ltd	5,000	....	5,000
Hans Renold, Ltd.	75,000	....	42,250
Halford Cycle Co.	35,000	....	25,000
C. A. Hyde (President of the Cycle & Motor Cycle & Traders' Union)	12,500	....	10,500
G. Heath	5,000	....	5,000
Humber, Ltd., Directors and Employees	25,000	....	25,000
Lanchester Motor Co.	5,000	....	5,000
Lodge Sparking Plug Co.	25,000	....	20,000
Joseph Lucas, Ltd.	25,000	....	15,000
Mr. Percy Martin	10,000	....	10,000
Middlemore & Lamplugh	15,000	....	5,000
Morgan Motor Co., Ltd.	20,000	....	3,500
M.L. Magneto Syndicate, Ltd.	5,000	....	5,000
D. Mason & Sons	25,000	....	12,500
Directors of above	25,000	....	20,500
H. Miller & Co.	10,000	....	10,000
Directors of above:			
C. A. Miller	7,000	....	3,000
F. J. Miller	5,000	....	1,000
Midland Rubber Co., Ltd.	38,000	....	14,000
J. Pedley & Sons, Ltd.	15,000	....	5,000
Charles H. Pugh, Ltd.	30,000	....	20,000
Mr. C. Vernon Pugh (Chairman, Rudge-Whitworth, Ltd)	6,000	....	6,000
Prices Co., Ltd.	25,000	....	25,000
Phelon & Moore, Ltd.	22,800	....	11,200
Employees of above	800	....	800
Rudge-Whitworth Ltd.	50,000	....	50,000
Rudge-Whitworth, Ltd., on behalf of Staff and Employees	10,000	....	10,000
Raleigh Cycle Co.	50,000	....	50,000
Rotax Motor Accessories Co.	20,000	....	10,000
Rolls-Royce, Ltd. (including Staff, £17,325).	151,300	....	140,995
J. Reynolds & Sons, and the Patent Butted Tube Co.	23,000	....	—
Joseph Sankey & Sons	25,000	....	25,000
Thos. Smith's Stamping Works, Ltd.	36,000	....	10,000
Siddeley-Deasy Motor Car Co., Ltd., Employees of above	10,000	....	10,000
Mr. M. J. Schulte (Director of the Triumph Cycle Co.)	11,500	....	6,000
Sterling Metals, Ltd.	10,000	....	10,000
T. Smith & Sons	20,000	....	11,000
Smith, Parfrey & Co., Ltd. (Staff and Workmen)	5,000	....	5,000
George Spencer Moulton Ltd.	70,000	....	70,000
Swift Cycle Co., Ltd.	25,000	....	25,000
S. Smith & Sons, Ltd.	20,000	....	20,000
Triumph Cycle Co., Ltd.	150,000	....	107,000
Tubes, Ltd	50,000	....	40,000
H. Terry & Sons, Ltd	69,250	....	34,000
Vinot Cars, Ltd.	10,000	....	10,000
C. A. Vandervell & Co., Ltd.	64,800	....	—
Warland Dual Rim Co	8,000	....	3,000
Wood-Milne, Ltd.	190,000	....	171,000
Willys Overland Co., Ltd.	50,000	....	50,000

PROTECTING THE BRITISH MOTOR TRADE.

Views of the Association of British Motor and Allied Manufacturers.

CIRCUMSTANCES which may tend to handicap the future of the British motor industry are briefly dealt with in a Memorandum drafted for the information of members of Parliament by the abovenamed association. It is pointed out that a very large number of motor cars and cycles are now in military or naval service, and, presuming that the bulk of these machines will be disposed of at the termination of the war, there is evident danger of markets being flooded and of great difficulty being experienced by manufacturers as regards the disposal of their output of new machines. Owing to special war taxation there will be a shortage of liquid assets available for the extension of trade, while the difficulty of disposing of full output will be aggravated by the fact that motor manufacturers have, in the execution of Government contracts, extended their premises and purchased large quantities of new machinery. For this reason it is essential that home markets be retained and foreign markets be widened and developed so that increased demand can be depended upon.

What to do with Time-expired Machines.

It is pointed out that the British motor industry having been concentrated on Government demands, a great deal of its goodwill has inevitably passed into the hands of foreign competitors. Many firms will not be in a position to resume their normal business after the war till they have had time to reorganise their works, and during that period they will require adequate protection against flooding of their markets, at home and abroad, by foreign competitors.

It is further urged that vehicles no longer required by the War Office and Admiralty should not be pressed for sale or disposed of by public auction, but should be disposed of for use in devastated countries, and the remainder marketed gradually with the assistance of manufacturers and their agents. All vehicles should be overhauled by their manufacturers before sale, and their subsequent condition guaranteed. This would protect the reputation of the manufacturers and the interests of the buying public.

THE QUESTION OF SUBSTITUTES.

PETROL substitutes are available at the moment, and may be used to eke out what petrol remains. There does not seem to be any prospect as yet of there being any restriction placed upon their sale, or any tax being imposed, provided, of course, the quantity imported is not largely increased and the Customs authorities do not demand a tax to be placed upon these fuels. It is certain, at any rate, that the Petrol Control Committee is by no means anxious to place petroleum and white oils on the same basis as petrol.

The reason that pressure has been brought by the Government to bear upon the Petrol Control Committee to issue no more licences after the present petrol tickets have expired is obviously to ensure that there are ample reserves in hand for the use of both the Navy and Army.

Demand and Supply.

The Petrol Committee has, of course, certain figures at its disposal which enable it to gauge the needs of the Services, and also the available tonnage at the country's disposal to bring in the petrol. The Committee knows the amount of petrol due to arrive in Great Britain between the present time and the end of April, and it knows approximately the requirements of the Services. It is aware how much is needed for essential commercial work, and if its calculations are correct there will be no surplus to distribute to private owners—allowing a reasonable margin for safety. In the unlikely event of the import of motor spirit exceeding the amount estimated, there may be a certain balance which could be licensed to the owners of private cars and motor cycles. It would be absolute folly, however, to calculate on this surplus, and we only mention it as being just a bare possibility.

THE A.C.U. IN WARTIME.

A SUMMARY OF THE FOURTEENTH ANNUAL REPORT OF THE YEAR'S WORK.

THE fourteenth annual report of the Auto Cycle Union is one of the best this body has ever produced since its inception, being a wonderful record of valuable war work, while, at the same time, the Union has succeeded in devoting its energies for the benefit of its members in a really useful manner, despite the fact that this is the third time the annual report has been issued during the war.

As regards membership, in 1916 seven hundred members wrote to say they proposed to take advantage of the concession by which members on service may become hon. members, and, notwithstanding the unsatisfactory conditions, the actual value of subscriptions and affiliation fees received exceeded that estimated, and is more than 50% in excess of the corresponding figures five years ago. Several clubs have continued their affiliation to the Union, and there is evidence of increased activity among motor cycle organisations in Overseas dominions.

Recruiting Activities.

The officers of the committee for 1916-17 are those elected for 1915-16, following the precedent set by parliamentary, municipal, and other bodies.

During the first six months of the year the staff were engaged in recruiting for the motor cyclist section of the Royal Engineers. The Secretary's scheme of a Central Office to co-ordinate the work of the various local reserve committees proved invaluable, and gradually became so automatic in its action that it was taken over by the military authorities. Since the Central Office was established in January, 804 recruits were finally passed, while 1,779 applicants were interviewed, and some 3,400 applications by letter were dealt with. The total number of applications for enlistment dealt with by the A.C.U. amounted to 11,579.

Letters of appreciation regarding the work of the A.C.U. were received from the Director of Staff Duties and the Commandant of the Signal Service Training Centre, and from Brigadier-General A. Campbell Geddes, Director of Recruiting. In his letter General Geddes writes:

> "I am directed to tender to you an expression of thanks and appreciation for the patriotic and cordial assistance you have rendered in this direction, and trust that your help will be available at any future date should the necessity arise."

The Proposed Motor Cycle Taxes.

As regards legislation, the proposed taxation of motor cycles in last April called for energetic action on the part of the Union. The matter was dealt with efficiently and promptly. After numerous interviews and correspondence, the A.C.U. suggested an increased tax on petrol, and the committee was of the opinion that the action taken by the Union directly resulted in the abandonment of the increased licence duties and the increased taxation on motor spirit, which, of course, is much fairer.

The National Motor Volunteers.

As regards other war work, the A.C.U. helped to secure the recognition of the National Motor Volunteers through its Secretary, who holds important positions in both the Volunteer Force and Special Constabulary, and the Union is also represented on the Central Committee for Employment of Discharged Soldiers and Sailors connected with the motor industry.

Routes and other Assistance.

The Touring Department has been engaged in dealing with applications for routes made by officers on leave or stationed in this country, and in making the necessary arrangements on behalf of members requiring the import or export of motor cycles and spare parts.

The committee has reason to believe that it will shortly be in a position to announce that the benefits of the R.A.C. "Get you Home" scheme will be extended to members of the A.C.U.

The Legal Department has done much valuable work, and two or three cases are instanced in which the Union was able to help members out of legal difficulties, while a good proportion of cases brought up against motor cyclists have been dismissed when the member has been represented by the A.C.U. solicitor.

Insurance.

Despite the war, the work of the Insurance Department has been very satisfactory. Over five hundred members have this year availed themselves of the concession granted to full policyholders—that is, free touring membership—whilst the valuable arbitration clause in the policy has resulted in three disputes being submitted to the Union for settlement, and satisfactorily concluded.

The A.C.U. Roll of Honour contains many famous names, the chief being that of the late Rear-Admiral Sir R. K. Arbuthnot, Bt., K.C.B., M.V.O. The statuette forming the trophy, founded to perpetuate his name, bears the following simple inscription:

ROBERT KEITH ARBUTHNOT,
Bt., K.C.B., M.V.O.,
Rear Admiral, Royal Navy,
Who died in action on H.M.S. *Defence*
at the battle of Jutland,
31st May, 1916.
A great motor cyclist.

Numerous other names are included in the Union's Roll of Honour; but it has been found impossible to compile a complete list of those members of the Union who have either died serving their King and country, or who have earned well-merited honours and awards in the service of the State.

AVERAGE PRICES.

WE give below the average prices of second-hand models offered for sale in *The Motor Cycle*. Where possible the average for the past week is quoted, otherwise the last average is given, if within four weeks.

Make.	Year.	H.P.		Average for last week.	Latest weekly average obtainable
A.B.C.	1914	3½	T.T. 3-sp. S-car	—	£70
A.J.S.	1916	4	3-speed	£70	—
,,	1916	6	3-sp. sidecar	£95	—
,,	1915	6	3-sp. sidecar	£80	—
,,	1915	2¾	2-speed	£40	—
Ariel	1916	5	3-sp. sidecar	—	£76
,,	1914	5	3-sp. sidecar	£48	—
Bradbury	1914	4	2-sp. sidecar	—	£50
,,	1913	3½	2-sp. sidecar	—	£35
B.S.A.	1915	4½	all-chain	£38	—
,,	1914	3½	T.T.	£32	—
Calthorpe	1915	2¾	2-speed	£25	—
Clyno	1914	2½	2-stroke	£27	—
,,	1914	6	3-sp. sidecar	£65	—
Connaught	1914	2½	2-str., 2-sp.	—	£21
Douglas	1916	2¾	2-speed	£50	—
,,	1915	2¾	W.O. model	£46	—
,,	1914	2¾	Model V.	£38	—
,,	1914	4	2-sp. sidecar	—	£62
Enfield	1916	6	2-sp. sidecar	£79	—
,,	1916	3	2-speed	£53	—
Excelsior (American).	1916	7-9	3-sp. sidecar	£80	—
Excelsior	1915	2-str., 2-speed		£25	—
H.-Davidson	1916	Combination		—	£80
Humber	1915	3½	3-speed	—	£53
Indian	1916	Powerplus comb.		£85	—
,,	1915	5	combination	£55	—
Ivy	1915	2-stroke		—	£24
James	1915	3½	twin, 3-sp.	£42	—
Levis	1915	Popular		£21	—
,,	1915	2½	2-speed	£30	—
Matchless	1915	5	combination	£70	—
,,	1915	8	3-sp. sidecar	—	£80
New Hudson	1915	2½	3-speed	£18	—
,,	1916	2¼	2-speed	£38	—
New Imperial	1916	2¾	2-speed	£39	—
Norton	1916	3½	T.T.	£45	—
P. & M.	1914	P. & M.	sidecar	£50	—
,,	1912	P. & M.	sidecar	£32	—
Precision	1914	8	3-sp. sidecar	£45	—
Premier	1915	3½	3-sp. sidecar	£42	—
Rover	1915	3½	3-speed	£50	—
,,	1914	3½	T.T.	—	£25
Rudge	1915	5-6	sidecar	£44	—
,,	1915	3½	3-sp. sidecar	—	£49
Scott	1916	3¾	combination	—	£58
,,	1914	3¾	sidecar	—	£40
Sunbeam	1916	8	combination	—	£100
,,	1915	6	combination	£85	—
,,	1916	3½	3-speed	£75	—
,,	1915	3½	3-speed	£90	—
Triumph	1916	2-stroke		£32	—
,,	1914	4	combination	£48	—
Velocette	1915	2½	2-speed	£24	—
Zenith	1915	4	countershaft	£43	—
,,	1915	5	Gradua	—	£49
,,	1914	8	Gradua sidecar	—	£42

NOTICE TO PETROL DEALERS.

UNDER an Order made by the Board of Trade, dated February 6th, 1917, all licensed dealers in motor spirit are notified that they are henceforth required to keep a book in which are entered particulars of all the motor spirit sold by them as follows:

ACCOUNT OF MOTOR SPIRIT SUPPLIED.

Date when Supplied.	Quantity of Motor Spirit Supplied. Gallons.	Name and Address of Purchaser.	No. of Petrol Licence held by Purchaser.*

* Particulars to be taken from the licence.

The book must be kept on the premises, and be open to inspection by any officer of Customs and Excise or by any officer appointed by the Petrol Committee.

Any person failing to comply with the Order is guilty of a summary offence against the Defence of the Realm (Consolidation) Regulations, 1914.

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address

PORT DESIGN ON TWO-STROKE ENGINES.

Sir,—I note "Excelsior's" statement that he can climb Sunrising on his Villiers two-stroke geared 5¼ to 1. I should like to say that I am rather doubtful of his performance; in fact, from my experience of two-strokes, I should say the feat is impossible.

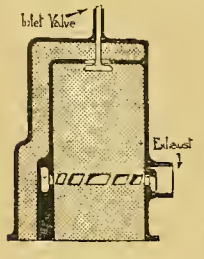
I have at present a Metro. two-stroke, single-geared 5½ to 1, and although it is one of the best I have ridden, and will easily climb such hills as Gorcot and Mucklow, I feel sure it would not get up Sunrising.

Would "Excelsior" ride over to Sunrising with me one of these days? We could have an interesting test of our respective machines in a purely friendly way. Since "Excelsior" also lives in Birmingham, I think this could easily be arranged, and I await his reply with interest.

Edgbaston. METRO. SINGLE-SPEEDER.

Sir,—I think "Progressive's" article on two-stroke engines calls for the following remarks:

Obviously he contradicts himself when he states that one of the advantages of two-stroke engines is "good thermal efficiency," and one of its disadvantages "high petrol consumption." The "brake thermal efficiency" of a good four-stroke engine is 24%, but I should be surprised to hear that on "two-strokes" of the type illustrated more than 17% is attained. My experience is that much better results are obtained on "two-strokes" by having a "straight through scavenge," obtained by placing the inlet valve on the cylinder head and having a ring of exhaust ports, as shown in the accompanying sketch.



A. H. Wilde's suggested port design for two-stroke engines (See letter.)

Of course, this complicates the engine, and makes it more expensive; but I am afraid that only on these lines can "thermal efficiency" be increased.

Regarding "Progressive's" suggestion that the exhaust port area could be increased by increasing the width, I should like to point out that there is a limit to this, as *local* cutting away of the cylinder wall will lead to cylinder distortion on heating. The previous suggestion gives ample area, and the cylinder being cut away symmetrically will not distort.

A. H. WILDE.

HEATING THE INDUCTION PIPE.

Sir,—I have noted with considerable interest the various letters that have appeared recently regarding the improved results obtained when the carburetter is fitted with a suitably arranged hot air supply.

The extreme cold, and the fact that only the heavier grades of fuel are now available, has tended in no small degree to emphasise the necessity of heating the induction system, and especially so in the case of the "flat twin," owing to the length of exposed inlet pipe. Neglect to provide adequate heating of this pipe has led to this type of engine in many instances obtaining an unenviable reputation for consumption and irregularity of running.

It is somewhat strange that what is known to be the best method of carburetter fitting on car engines is usually totally ignored when fitting a carburetter to the engine of a motor cycle, as in numerous instances I have seen carburetters *attached* (not fitted) in such a manner as effectually to preclude any possibility of even reasonable consumption being obtained, and a certainty of their freezing up in average winter weather.

As far back as 1912, in the fitting leaflet supplied with all Everest carburetters, special attention was directed to the necessity of the proper heating of the induction system if maximum results were to be obtained, together with suggestions as to how this may be accomplished, and also the reasons for its necessity.

Mr. G. E. Bradshaw, in your issue of January 25th, also testifies to the "vastly improved" results obtained when this method was adopted, which, doubtless, would also have saved "Ixion" an unpleasant experience. E. P. EVEREST.

BRITISH MAGNETOS.

Sir,—Having read a lot lately *re* magnetos being made in England, I wish other motorists to know of the handsome way one of our English firms has treated me. I ride a 1916 Rudge Multi fitted with a C.A.V. magneto. One day I had to pull up through the engine misfiring. I found the points were badly pitted on the contact breaker. I trimmed them up, and got on all right. I wrote to Messrs. Vandervell at night, explaining the trouble I had had, as I did not think it ought to have been so bad in the time. To my surprise, I received a new magneto by return of post, to use whilst I sent mine to them to overhaul. After a few days I received my magneto back, and, of course, I returned the one they so kindly lent me. They have not charged me a penny.

I must say that if all English firms treat their customers in the same way, there will not be much room for foreign firms after the war. H. J. BLAND.

FORCED INDUCTION FOR FLAT TWINS.

Sir,—Now that the so-called "flat" twin is occupying such a prominent position in motor cycling topics, I would be pleased to see a criticism of the following suggestions:

We know that in two-stroke engines crank case compression is very nearly perfect. Also that automatic valves in the piston heads have been proved successful in the highly efficient aero engines. Why not incorporate these two factors in the opposed twin? Theoretically, I mark these advantages: *(a)* Abolition of two long induction pipes. *(b)* Cooler piston head; therefore, less carbon. *(c)* Gas forced into the cylinders under pressure, *e.g.*, twice the c.c. of one cylinder is reduced into the crank case, and on the inward strokes this gas is forced into one cylinder. In practice, no doubt, only about one and a half times the volume of the c.c. of the cylinder would be injected. *(d)* The present two side by side or overhead valves could both be for exhausts. The advantages here are obvious—both for silencing and rapid scavenging. The valve in the crank case could easily be mechanically operated, although with the powerful induction the automatic would be a success. The piston inlet valves should be more efficient than the side or overhead inlet because a higher lift is possible. The vacuum in the cylinder and speed of the piston tends to raise, and the crank case compression forces open the valve. Then the change of piston direction and cylinder compression tend to close the valve rapidly. Lubrication, housing of cams, etc., and accessibility of inlet valves could easily be solved by a clever designer. The result would then be that, say, a 2¾ h.p. engine would develop more power than the present 3½ h.p.'s. This should more than repay for the slight additional complications.

There is nothing new under the sun, and possibly the above idea has been fully worked out and rejected. However, I have been one of your readers for several years, and do not remember having seen the subject broached.

Wimbledon. C.L.V.C. 2872.

SINGLE V. TWIN-CYLINDER ENGINES.

Sir,—Allow me, along with R. C. M. Kermode, whose letter appeared in your issue dated February 8th, to express my surprise that there seem to be so few exponents of the big twin for solo riding. To riders who, like myself, appreciate power, speed, and simplicity, the big twin, with direct belt drive and perhaps a good hub clutch, appears ideal. In pre-war days I used to ride such a mount, without a clutch, however, and I was in the habit of riding it with the exceptionally high gear of 3 to 1. Of course, the acceleration was not so good as might be, but never have I been able to produce the slightest knock. It was not at all a racing type of engine, and would commence to fire at a little above walking pace, ticking over in traffic till one could almost "count the revs." The pleasure of riding a big twin solo with a fairly high gear has to be experienced to be realised. Personally, I always like to feel that, however fast I wish to go, and however hilly the country I encounter, I rarely have to push the engine beyond 75% of its full power. I do not think I can be accused of being a "road hog," yet the knowledge that, go as fast as I can, I shall still have two or three horse-power to spare is very pleasant to me. To the real motor cyclist, the knowledge that his mount is "all out" has few attractions. Even if one rarely has to use it, it is comforting to feel on a long, hilly run that one has plenty of reserve power and is not pressing the engine unduly. It was always my boast that I could generally bear my hand on the cylinders at the end of a run. Why not have as much power as one can get, provided one can get a reasonable petrol consumption and medium weight (which generally go together), also a certain amount of tractability? The machine I rode combined these essentials, and I do not consider it in any way exceptional. Eighty to eighty-five miles per gallon I could obtain any time, owing probably to the high gear, whilst I could travel at practically any speed the road would allow, and this without the slightest sensation of effort or vibration. Neither is a mount of this type necessarily at all heavy.

Of course, this machine would not suit any rider, but to one who, like myself, has not reached the age when thoughts turn to touring bars, four-speed gear boxes, and family sidecars, and who does not mind a bit of inconvenience in thick traffic, the extreme simplicity, reliability, and power of such a machine appeal strongly. I rode my 8 h.p. solo some thousands of miles, and of all the other bicycles I have had none gave me such pleasure in riding, so little trouble, and so little expense of upkeep. Like one of your former correspondents, "I dream of a powerful twin and smooth straight roads." (Pte.) FRANK L. SHIELD.

Sir,—The lively controversy anent the respective merits of the single and flat twin is surely the most interesting and educative argument that we eager readers week by week have been privileged to enter into since the very early days of motor cycling. So far, the single enthusiasts do not fear the foreshadowed doom of a tried, proved, and trusted friend, but as in turn each owner is tempted to try the delights of the flat twin the manufacturers will require to turn out the 180° type in ever increasing numbers. The pros and cons have been threshed out so well that perhaps my own experience may seem flatter than anything, twin or no twin, but a year's mileage of 6,000 on a 2¾ h.p. Douglas, requiring no renewals except two sparking plugs, valve springs which did not break but lost temper, and retreading of back cover, is surely convincing. The transmission is in perfect condition, and though when last I had the engine down the big ends had the least shade of play, all other bearings and piston rings were in capital order. I found that the fitting of a long exhaust extension 1in. pipe not only improved the tune, but the tone also; effect—the song of the Gnome. Combining pleasure with training at High Wycombe, I straddled the tank at the end of each week, and over a very difficult course reached home at Enfield in never less than one and a half hours, which included the climbing of Amersham hill with its bad "take off." One outstanding run, Enfield to Hitchin, twenty-five miles, with flapper bracket occupied, in fifty-two minutes. Not much at first glance, but really good when I mention the machine is single-geared, and has never once been driven all out. My view of the position is perhaps a narrow one, but the type of power unit which made the reputation of the finest lightweight existent can and will be developed to take in practically all machines, except where intended for exceptionally heavy sidecar work, in which class the miniature "four" designed on car lines has the better field. I feel sure that most of the single devotees will succumb to a general preference for the flat twin once they take it to their hearts. In spite of all restrictions *The Motor Cycle* retains its old standard, and my pals, who once knew not the difference between a magneto and a mudguard, now command me to help them obtain a "'bus" of some sort when the open road (and hairpin corners) await us all once more. Usual disclaimer. GNR. J. CHESHER.
B.E.F., France.

AN APPEAL FROM THE FRONT.

Sir,—It is with the utmost pleasure that I look forward to receiving my copy of *The Motor Cycle* each week, as there is always contained therein some topic to interest every class of motor cyclist.

With reference to the "Single *v.* Flat Twin" controversy, may I be permitted to state my opinion. I favour the single-cylinder, as from fifteen months' experience out here with both types I find the single much easier to keep in tune than the (may I call it its rival?) flat twin. Decarbonisation and the grinding in of valves is to most motor cyclists a bugbear, but with the single-cylinder it is not a long job. Mudguarding still needs more thoughtful consideration than it has received up to the present. Motor cyclists soon become coated with mud out here simply through the lack of mudguards of ample proportions. In wet weather one's motor cycle and person are simply smothered in mud, and in weather when the mud is tacky the clearance proves to be insufficient, in consequence of which both wheels soon become clogged. I notice that the new Matchless has both its valves enclosed, and I only hope that other manufacturers will do likewise. The motor cycle (a well-known make) which I am riding at present was called upon almost to wallow in mud when I was stationed at Combles, and I soon found the absolute necessity for protection for my valves, both of which would persist in sticking, owing to the adverse conditions.

When are we to receive a really weatherproof magneto? I have more than once experienced the same discomfort as "Ixion" with regard to the aluminium plates warping; and, as a matter of fact, the motor cycle I am now riding is fitted with a magneto having the self-same faults. Plugs are also far from faultless, as even under a moderate gruelling they soon pre-ignite. The bearings in the steering head are inadequate for the strain they are called upon to bear, and I only hope that manufacturers will soon realise this fact. Tool-bags are apparently a useless addition to the machine, and soon rattle loose, and are not long in falling off. For this reason our workshop does not fit them now, and so all tools and spares are carried in a haversack. There is barely sufficient ground clearance on many present-day machines, and too often does my crank case hit the ground. However, with all its defects, the motor cycle of the present day is a marvel, and does its work thoroughly and well.

I have noticed that many D.R.'s have transferred their affections to horses; but, personally, I would sooner my machine encounter adverse conditions, and so find its faults, than avail myself of other means of transit.

I will now conclude by wishing your paper, and motor cycling in general, the best of luck. F. BRIGGS.
B.E.F.

A HOME-MADE KICK-STARTER.

Sir,—Your correspondent from South Africa who desired information as to a simple means of providing a 1912 6 h.p. Zenith with a kick-starter will not, I am afraid, be able to utilise the ingenious method outlined by "Kicker" in *The Motor Cycle* for February 1st. In the first place, the 1912 6 h.p. Zenith has the magneto driven by chain; at any rate, any 1912 model that I have seen is so fitted. Consequently, the intermediate wheel next to the magneto which "Kicker" first experimented with is not on the 6 h.p. model, so he would require to change his plans a little to fit his home-made kick-starter to a 6 h.p. model. In the second place, it would require a skilled mechanic who could use a lathe to undertake the making of "Kicker's" starter.

I have also been trying to fit a kick-starter to a 6 h.p. Zenith, and although my efforts have not as yet been a complete success, still I hope, with a few more alterations, to possess a serviceable one. The free engine that can be obtained by lowering the Gradua gear does not possess the advantages of

a hub or countershaft clutch; and besides, if used constantly as a clutch for starting and in traffic it would wear out rubber belts in no time. Being aware of this, I obtained a second-hand clutch hub. I got a new spindle made for the hub to fit the chain stays of the Zenith. I fitted the clutch pedal to the slotted plate No. 1 (known to all Zenith riders), so that the movement of the back wheel would not interfere with the clutch adjustment.

Some weeks ago there appeared in *The Motor Cycle* a simple kick starter for Triumphs and other pedal machines. I used the tip, which got me easily over the difficulty of starting with a kick. The machine is now equal to a 1916 model. The clutch hub allows starting from the saddle, and all traffic dangers are things of the past. I have not yet fitted the rear brake, as it will require to be fitted to the right side, or else work inside the groove of the belt pulley. If any one could give me any hints as to fitting the brake, and also tell me if it would be possible to fit hand control to the clutch I would be much obliged. BOSCH.

Eglinton, Co. Derry.

VALVES AND EFFICIENCY.

Sir,—I am quite in accord with "LK 1810" that overhead valves are by no means the last words in engine efficiency. I also have a 1914 3½ h.p. Premier fitted with extra exhaust ports, and a heavy C.B. sidecar attached, and it has not yet failed me nor jibbed at any hill. With the exception of a new back cover and belt, the machine is still the same as when it left the Premier factory, being still "good looking" and equal to new.

I am not interested in records, but have followed closely all reliability trials and the T.T. races. At present I am closely watching the development of the flat twin.

Llanwrtyd Wells. D.C.W.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—Your correspondent, Mr. Esnouf, asks if I have never heard of cases in which both parties swear that they blew their horns but neither heard the other. Certainly. There are plenty of such cases, but, fortunately, there are also far more cases in which a horn *is* heard and a collision avoided. Has your correspondent never met with a cross road which cannot be seen when travelling on the main road on account of high hedges or buildings, etc.? If a car is travelling along the main road and another is travelling along a cross road at such a time that they will meet at the same spot, it ought to be obvious to anyone of average intelligence that there *must* be a collision if the driver in the cross road blows his horn and it is not heard by the driver in the main road. By sheer good luck, a deaf driver may avoid accidents for some years—so might a nearly blind driver—but neither should be allowed in the driver's seat. As to runaway horses, there have been several cases in my neighbourhood within the last two years.

M. HITCHCOCK.

STARTING ON ACETYLENE.

Sir,—There has been much talk in these columns recently on the fearful dangers of using acetylene gas for motor cycle engines. We are warned that if we use it we are likely to get blown off the earth, or something dreadful, but has anybody ever thoroughly "tried out" its possibilities? As far as I can make out, the only people who have ever tried it at all are those who have taken their lamp generators and just fixed the tube into the carburetter orifice or the induction pipe, turned on the water, and then started their engine, never worrying about how much gas they are giving it, with the result that they have given it enough to blow the cylinder off. This is hardly a scientific way of testing it.

Is it necessary to give the engine such a violent charge? Cannot it be diluted with air, or given in a small enough quantity to get the right explosive pressure, if it cannot be diluted? We could have a smaller combustion space.

I should imagine that the generator necessary for an ordinary motor cycle engine would be much smaller than the present petrol tanks, and would probably be much cheaper to run on than petrol; also your gas would not depend on the suction of the piston for its production.

I have never used acetylene for any purpose other than lamps, but now that petrol is "off" we have got to find something else or go without, and the substitutes at present on the market appear to be a good way behind petrol for general efficiency and facility of use.

Can anybody give a decisive reason why acetylene cannot be used? The mere fact that it is a much more violent explosive than petrol gas is hardly sufficient.

K. V. CHIDLEY.

Sir,—Just a few words, with your kind permission, on the letter in your last issue from the British Acetylene and Welding Association.

To begin with, its general character leaves something to be desired from the point of view of the generally courteous character of "controversies" in your paper.

I am not concerned to vindicate any claim I made to knowledge. It is backed by quite substantial guarantees from our highest institutions.

The letter you published last week from one who had tried acetylene, curiously enough, gave as one main reason for dropping it the probability of the cylinder being blown off, so I appear to have the practical experience of motor cyclists to back me in the matter of a warning which was admittedly made on general scientific grounds.

Mr. Lucas is "at a loss to know what object" I had in writing. My object was the safety of my fellow motor cyclists. Let me remind you I did not question the results said to be obtained, and stated that in so many words, as also that I knew it had been tried with varying success in different forms of internal combustion engines.

Might I ask what object the secretary of an acetylene commercial association has in his somewhat unnecessarily severe attack on an unknown correspondent, with his direct and derogatory personal statements?

I assume that Mr. Lucas knows (as I know) the practical method of acetylene welding, and the very large use to which the oxy-acetylene flame is put, not only in Government dockyards, but in most garages where repairing is done to any extent. If he knows, his knowledge tells him that the two gases are kept in separate containers, and that in the usual "blow through" jet it is a scientific inaccuracy to speak of the gases being mixed in anything like the way in which the expression "mixing" describes the condition in the cylinder of an engine, the real fact being that a jet of pure acetylene burns in a surrounding envelope of oxygen; or (according as you look at it) a jet of oxygen burns in a surrounding envelope of acetylene. There is no mixture before combustion.

Even if a "mixed jet" be employed, Mr. Lucas must know that a very small chamber indeed is supplied in which the two gases may become mixed, and that the employment of such a jet requires far more skill; that the accurate balancing of the mixture is one which requires control valves to guard against oxygen being forced into the acetylene container, or *vice versa* by way of the said very small chamber; in fact, that a "mixed jet" is decidedly one which would never be put into the hands of anyone but an expert, whilst a "blow through" as usually employed may be worked by any person of average intelligence. The quoting of acetylene blow flames as evidence of unrestricted mixing of oxygen and acetylene in actual practice is, in fact, a bit of "special pleading" that has no bearing at all on the question of internal combustion engines; otherwise, will Mr. Lucas recommend us to use the same materials in engines as blow-pipes, *i.e.*, pure oxygen and acetylene, with perfect confidence in the continued existence of our engines, not to say ourselves? For the calorific value would be enormous. Please note, I ask the above question to be answered without any side issues as to expense.

Mr. Lucas ridicules my statement as to there being a law against making a mixture of acetylene and oxygen in the sense any ordinary person would attach to "making a mixture." Will he kindly call at the office of the Board of Trade and obtain confirmation of his view? If he does so I will admit that I misread a statement in the public press some time ago.

One last point. Mr. Lucas speaks of certain engines in use in country houses, etc. (he speaks, indeed, of hundreds), successfully using acetylene: has he thought of the very great difference in the strength of an ordinary gas engine cylinder and the light casting of a motor cycle engine?

He asks me to state my "fatal" accident instance. I stated in my original letter where an account of it could be found. F. C. LEES, M.A. Oxon.

THE ISOCHRONOUS SPEEDOMETER.

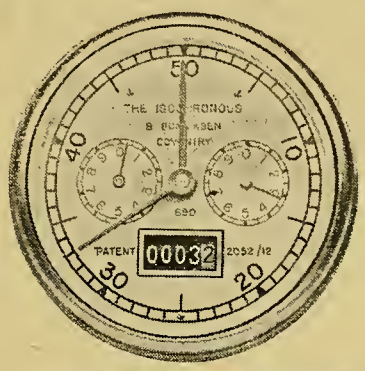
An Instrument Designed on the Principle of Equal Intervals of Time.

IN its action the Bonniksen speedometer is the most original and ingenious instrument of its kind. It is produced in Coventry at the Norfolk Street Works of Mr. B. Bonniksen, and the inventor is in the happy position of being able to make delivery in a reasonably quick time, which will interest those who have necessity to check their mileage. During a recent visit to the works we were shown the inventor's tackle for demonstrating the working of the speedometer, and the internal mechanism was also exposed for our inspection. Some time ago we described the instrument in *The Motor Cycle*, and have previously referred to the excellent finish of the parts.

Probably the two points which will appeal most strongly to the ordinary rider are, firstly, that the speed indicating hand is absolutely steady, indicating the reading without fluctuation, and so enabling the speed to be read accurately, no matter how fast the machine be travelling or how bumpy the road. The second point is that, although only calibrated to 50 m.p.h., speeds can be recorded up to 100 m.p.h. or more.

How the Speed is Indicated.

The dial, which is 3in. in diameter, is calibrated from 5 to 50 m.p.h. Two hands are used in this instrument, and working alternatively one indicates the speed for a period of exactly five seconds, when it returns to zero, the second hand having in the meantime taken up a position to give the reading. Thus the speed indicating hand remains rigidly in position for five seconds, and any acceleration or deceleration is not shown till the other hand comes into operation—the reading, therefore, being given in corrections at five seconds intervals. With the aid of this information those riders who are mathematically inclined are able, by means of a table provided by the makers, to calculate the available horse-power of their machines at certain speeds.



The Bonniksen Isochronous Speedometer. The two small dials register the trip mileage up to 100.

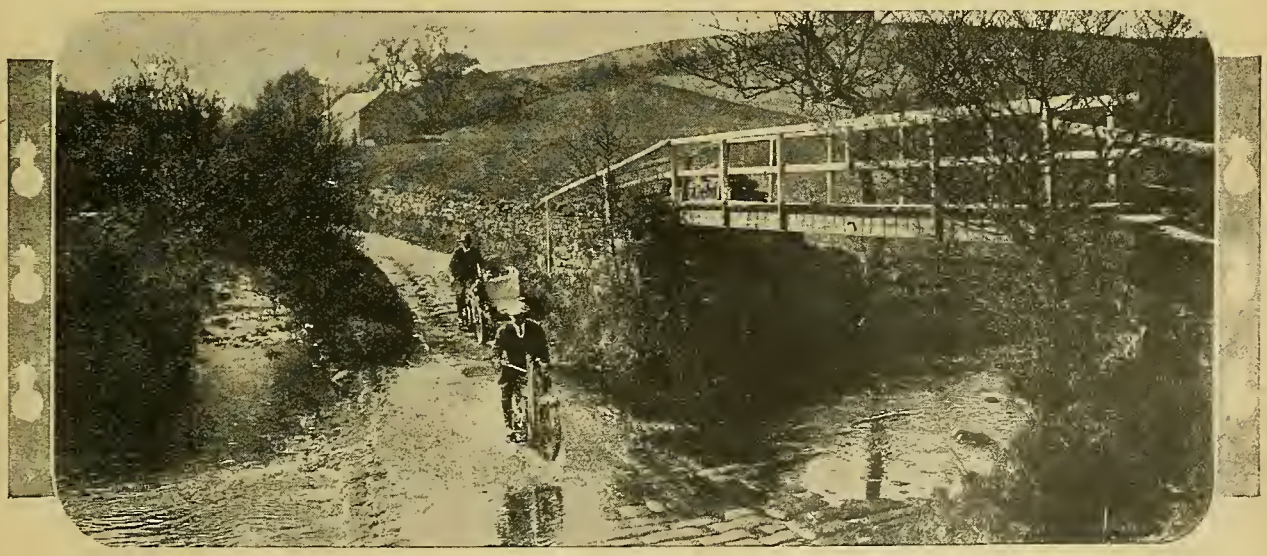
The Principle of Working.

Practically all speedometers are governed by centrifugal governors, though some are magnetically controlled. The Isochronous, however, is controlled in the same manner as the hands of a watch, viz., by means of a balance wheel and spring. In the Isochronous the distance is registered by the indicator hand, which is geared direct to the road wheels by a flexible shaft, while the time is accurately controlled by the watch mechanism. The watch escapement wheel is driven by means of a tiny friction clutch, which takes the place of the main spring of a watch, and causes the balance wheel to oscillate, giving exactly two oscillations in half a second, irrespective of the machine's speed.

The watch mechanism operates a simple device for locking and releasing the indicator hands alternately at five second intervals. The working is as follows: With the machine travelling at, say, 20 m.p.h., No. 1 hand, being released, travels round the dial at a certain speed, which is decided by the speed of the road wheels. When the hand has moved for half a second and gained the 20 m.p.h. reading on the dial, the locking device comes into action and stops the movement of the hand, keeping it rigidly fixed in that position for exactly five seconds, after which it is released and travels on to the zero point ready for a fresh start. The movement of the second hand is exactly similar, and the two come into operation alternatively, so that there is always one hand indicating the reading, while the other remains idly at zero. In other words, the hands operate in turn, each indicating for five seconds, at the end of which space it flies back to zero and the other takes its place. When speeds above 50 m.p.h. are to be recorded, the indicating hand travels one complete circuit of the dial, and gives the reading above the 50 m.p.h. mark; thus 60 m.p.h. would be indicated by one complete revolution of the needle and a reading of 10.

A Time Tested Principle.

The reliability and accuracy of the watch movement is so universally admitted that it is quite unnecessary to enlarge upon it here, and our personal experience with this interesting speedometer goes to prove the absolute reliability of its mechanism and accuracy of reading. The Isochronous speedometer is supplied in several patterns suitable for all types of vehicles, and also with total and trip mileage recorders incorporated. The one illustrated is of this pattern, the right-hand dial recording up to 10 miles, the left-hand dial recording from 10 to 100 miles.



NECESSITY KNOWS NO LAW.

In many parts of Yorkshire the only method of crossing streams with a motor cycle is by fording. A narrow footbridge only is provided. The splash shown above, having a stone foundation, is certainly an improvement on a mud bottom.

QUESTIONS AND REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C., and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Valve Timing.

My 5-6 h.p. Antoine has automatic inlet valves, and I want to make them mechanical (3in. bore, 3in. stroke). (1.) What is correct for inlet and exhaust open and close on piston stroke? (2.) Should inlet cam have same lift as exhaust? (3.) Should a V twin be perfectly balanced.—J.H.

(1.) The inlet valve should open just after the piston has commenced to descend on the suction stroke, and remain open while the flywheel turns through 190°. The exhaust should open when the piston is half an inch from the bottom of the firing stroke, and close as the inlet opens. (2.) Approximately so. (3.) A V twin cannot be perfectly balanced, but if the cylinders are at an angle of 90° it can be very well balanced.

Worn Belt Pulley.

My motor cycle is a 2¼ h.p. lightweight, fitted with a variable pulley and ⅝in. belt. I am always troubled with bad belt-slip, even with a ¾in. belt, both on bottom and higher gears, though the trouble is, of course, more acute in wet weather.—F.H.D.

It is probable your belt pulleys are out of line, or the pulleys cut to the wrong angle. We should recommend you to use a new ⅝in. belt and a new engine pulley, and take great care to see that everything is in line, and that the pulleys are made to the correct angle, viz., 28°.

Petrol Substitutes and Starting.

I had intended going in for a motor cycle to do my parcel delivery, etc., to cope with increasing trade and lack of hands, and seeing the paragraph in "Current Chat" last week that substitutes for petrol were available, I should be pleased to have your opinion on Kempol, whether this will start the engine without any use of petrol, and if not, what would it be necessary to do to have the engine start entirely on the substitute?—W.M.J.

We believe Kempol to be a very good substitute, but it is doubtful whether you could rely upon it for starting without an injection of some lighter spirit. If boiling water be poured over the induction pipe after flooding the carburetter, so as thoroughly to heat it, some engines will start right away on a heavy fuel, but boiling water is not always available. You would probably be able to start up after an injection of methylated ether, but you would not require more than, say, one pint of petrol a week if you used it only for starting purposes. We have found practically all the well-known substitutes to answer satisfactorily, provided an efficient hot air intake be fitted, but invariably an injection of petrol proved necessary for starting up from cold. If you could obtain a small quantity of methylated ether for injecting through the compression taps for starting you would probably be able to manage, as when once the engine was warmed up you would experience no difficulty in effecting a restart.

Starting on Acetylene.

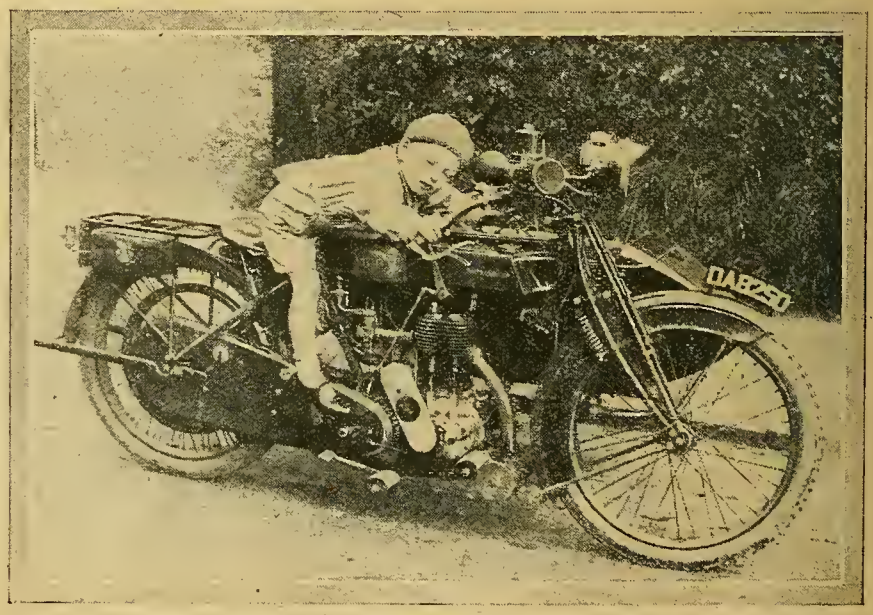
I have a 1912 2¾ h.p. Douglas. (1.) Could this be started on acetylene and run on Petrofin? (2.) How is the carburetter (Douglas) arranged to take both acetylene and Petrofin?—G.E.S.

(1.) The carburetter should have a hot air pipe leading from the cylinder fins to the fixed air inlet. The early pattern of this make of carburetter was not fitted with one, but any cycle mechanic would fit one up for you. (2.) As regards starting on acetylene, opinions as to the advisability of using this are exceedingly divergent. Some people have used acetylene with success for some years, while others have had accidents, suffering from broken connecting rods and even burst cylinders. The acetylene is introduced through a small tube fitted in the inlet pipe. The petrol substitute referred to has been praised by readers.

No Power at Slow Speeds.

I have just acquired a 1916 3½ h.p. machine. This develops exceptional power so long as the revolutions are kept up, but there is none of that hard pulling at slow speeds so generally advanced in favour of the single, and especially the long stroke single. On a slope, as soon as the revolutions drop to a certain point the engine "konks" badly. Also, when ascending a hill with sidecar at moderate speeds when the throttle is fully opened, the carburetter invariably chokes. The magneto has plenty of range for retardation, and the engine bearings are in perfect condition. I shall be much obliged for your advice. —E.D.M.

The trouble may be due to lack of compression, owing to the valves requiring to be ground in, to the machine being geared too highly, or possibly to the bad petrol obtainable at the present time, certain brands of which are very prone to cause knocking. Be careful not to drive on too weak a mixture.



The "Sunbeam" and the "son." A pleasing picture of Mr. T. Blyth Clayton's little three-year-old, who is already a very keen rider—in the sidecar.

Starting in Cold Weather.

I have just purchased a 1915 single-cylinder fitted with a two-speed gear. In cold weather it is very hard to start. Can you help me?—S.B.

To start easily in cold weather flood the carburetter and inject a little petrol into the cylinder. Do not open the throttle too wide, but close the air. If the machine is very refractory at starting take out one of the sparking plugs, turn it upside down, and fill the cup with petrol, then screw it quickly into the engine and attempt to start.

Licences.

Could you please inform me as to the rules governing the licensing of motor cycles? I am told that, as I do not intend using my outfit this year for various reasons, I am not obliged to pay the licence, but that there are certain rules to which I must conform, one of which is that the motor cycle must not be in running order. Also, if the motor cycle is not licensed, is that any drawback to selling?—D.T.

If you have not used your machine this year you are not called upon to pay any licences whatever, but should it be taken out once and ridden by anyone you become liable for the payment of the Inland Revenue tax. There is no rule to the effect that the machine must not be in running order. The only way in which the fact that the machine is not licensed could possibly affect your chance of selling is that you would not be in a position to give your prospective purchaser a trial run.

Carburetter Adjustment.

My machine is a 2½ h.p. four-stroke fitted with a B. and B. carburetter which has a No. 35 jet. Is this too large? When running I cannot give full air unless the throttle is nearly fully open. Does one consume as much petrol when running slowly as fast? I have only just bought this machine, and upon applying for the transfer of ownership I am informed that I must reregister it to continue to use the present number, because I am told the registration was cancelled last February. The dealer I bought the machine from denies that he cancelled the registration. Could the previous owner have done so? I thought it was only necessary to reregister if the number is to be altered.—V.A.B.

The jet certainly seems to be on the large side, unless the carburetter is one of those which has a movable needle in the jet; but what you say about the air adjustment of your machine seems to indicate that the carburetter is quite correctly adjusted. You should only be able to give full air when the throttle is open fully. The least petrol is consumed when running at about twenty miles an hour, and the most when running absolutely "all out." Yes, the previous owner may quite well have cancelled the registration of the machine you have bought. Under the circumstances you will have to register the machine afresh, paying five shillings.

Fixing Platinum Points.

The platinum points of my magneto are about worn out. I have platinum suitable for the job, but would like to be sure that the points are riveted on or otherwise securely fixed. I have used platinum for various electrical instruments, and have soldered it on the former, but the platinum points were only very small.—N.J.

Platinum points are either silver soldered or electrically welded into the rivets. Soft soldering will not do.

Difficult Starting.

My motor cycle will not start unless I inject petrol into the cylinder. I have also to have the spark well advanced before I am able to start. Could you tell me the reason and the remedy for this?—I.G.

There is nothing extraordinary in your having to inject petrol during the cold weather, and also in having to advance the spark for starting. Most machines require these preliminaries. After starting you might retard the spark a little if you find that this permits the engine to run more evenly. If the engine backfires when the spark is fully advanced, you might set the magneto timing a shade further retarded.

READERS' REPLIES.

Misfiring.

Re the "misfiring" troubling "T.B." (February 1st.) I was troubled with the identical symptoms on my Rudge Multi, also fitted with Ruthardt magneto, and found that the bearing of the fibre wheel in the contact breaker had worn oval, so that by every sixth revolution it came to the part out of the centre, thereby not opening the points on that stroke. A new fibre wheel should overcome the trouble, or if that is unprocurable the bearing of the present one may have a bearing inserted centrally and go on again quite satisfactorily. The above may also interest "F.W.R." (January 25th), who seems to be suffering from the same trouble. Probably being a two-stroke engine would explain why it misses at the twelfth explosion, whereas with "T.B." it is the sixth, as it also was with mine.—W. J. Wilkinson.

Tuning a Scott.

May I be allowed to add to your reply to "G.G." on the above subject? He does not say what carburetter is fitted. If it is a Scott carburetter, he might see that the air valve on the end of the carburetter is functioning properly. I had a similar experience with mine, which proved to be caused by the air valve being rusted up, so that it would not open with the suction of the engine. Consequently it used an excessive amount of petrol. Secondly, dismantle the pepper-box silencer on the end of the exhaust pipe, and see the holes are free. It may not be this, as chokage here only causes loss of power through the inability of the incoming charge to drive out the exhaust. Still, it is one of the points that want attention, and will take off more power than dirty gauzes. I have never had any bother with them. I quite agree with you regarding the necessity for care in the making of the joints, but any slight leak round the holding-down bolt pins is negligible, if the pins are properly tapped home, as there is no compression at the point. I do not agree that Scotts do not pull well after being decarbonised; this has not been my experience; but I never chip out the carbon under the rings of any internal combustion engine. I look upon that as so much packing to prevent leakage. Of course, the rings must be free in their grooves, but if one considers for a moment, there can never be so much carbon accumulate under the rings as to cause them to jam in the cylinder; it can only fill up any space there may be, and so form packing. I have just decarbonised mine, and on the very first run it has never pulled better. See that the pistons are oiled before putting on the cylinders. I do this with a brush, using a mixture of petrol and oil; the petrol evaporates, and leaves a thin even coating on the piston and in the cylinders. Only oil the cylinders about one-third to one-half the way up, or there will be too much when the rings have pushed it up to the end of the stroke. I agree with you regarding the suitability of the Scott for long journeys with side-car. They consume rather more petrol than some, but mere petrol consumption is not everything. I find it very easy on tyres, due to the steady torque no doubt.—D. G. Taylor.

DELAYS IN POSTAL DELIVERIES.

In view of depleted staffs, the curtailment of railway services, and the consequent delay in delivery of mails, readers will greatly assist by forwarding communications (including advertisements) as much as possible in advance of the dates of the issues for which they are intended.

RECOMMENDED ROUTES.

Grantham to Rochdale.—W.R.D.

Grantham, Newark, Southwell, Mansfield, Chesterfield, Baslow, Chapel-en-le-Frith, Hayfield, Glossop, Ashton, Oldham, Rochdale.

Farnborough to Dartford.—R.C.

Farnborough, Ash, Tongham, Normandy, Guildford, Shere, Dorking, Reigate, Redhill, Godstone, Westerham, Riverhead, Shoreham, Eynsford, Sutton-at-Hone, Dartford. Approximately 65 miles.

London (Tally-ho Corner) to Boroughbridge.—J.W.R.

From Tally-ho Corner the route is absolutely direct *via* the Great North Road, which you follow through Barnet, Hatfield, Welwyn, Stevenage, Baldock, Biggleswade, Eaton Socon, Buckden, Alconbury Hill, Norman Cross, Wansford, Stamford, Grantham, Newark, Retford, Tuxford, Bawtry, Doncaster, Ferrybridge, Aberford, Wetherby, Boroughbridge. Approximately 210 miles.

Agricastrol.

In view of the great possibilities of agricultural motors, Messrs. C. C. Wakefield and Co. have introduced a special oil for this class of work under the name of Agricastrol motor oil.

Foot Pumps Advanced in Price.

The Wood-Milne Co., Ltd., ask us to state that, owing to increasingly high prices of raw materials and labour, their patent foot pump has been advanced in price 10%.

Motor Cycle Horns.

Those motor cyclists who object to the piercing shriek of the mechanical hooter would do well to peruse the A.M.C. list of electric motor horns. Type F is a useful model for motor cycles, and can be used with the Flash four and a half volt dry cell battery. The address is Apollo Works, Moseley St., Birmingham.

Armstrong Tricycles.

Our readers may remember the Armstrong motor tricycle—a rather unconventional form of three-wheeler made by Messrs. Armstrong and Co., 72, Goldhawk Road, Shepherd's Bush, W., which was described in the issue of *The Motor Cycle* for February 18th, 1915. We are asked to state that during the period of the war the makers find it impossible to turn out any of these tricycles.

Watford Speedometers.

The old-established firm of Nicole, Nielsen, and Co., Ltd., 14, Soho Square, London, and Watford, will in future trade as North and Sons, Ltd. The original business was high-grade complicated watchmaking, but with the development of the motor industry additional scope was found in the manufacture of speedometers. Magnetos have now been added to the output of the well-equipped works at Watford. The business will continue to have the experienced and practical guidance of Mr. R. R. North, the governing director.

Palmer Tyres.

The Palmer Tyre, Ltd., inform us that so far Government requirements still prevent them from executing orders for 750 mm. × 75 mm. Palmer Cord heavy motor cycle tyres, in the three-ribbed pattern, to fit 650 mm. × 65 mm. rims, and also for 26in. × 3in. Palmer Cord heavy motor cycle tyres of the three-ribbed and steel-studded pattern for 2½in. rims. They have, however, a good supply of 700 mm. × 80 mm. Palmer Cord heavy motor cycle tyres, ribbed pattern, to fit 650 mm. × 65 mm. rims, which motor cyclists will find quite satisfactory on most heavy sidecar combinations. They can still supply a 28in. × 3in. pattern tyre to fit American machines

Vaporine Petrol Substitute.

We are informed that all enquiries for the petrol substitute sold under the name of Vaporine should be addressed to Mr. A. Brierley, 22, Sir Thomas Street, Liverpool. There appears to have been some miscomprehension, leading to wrongly directed enquiries, as regards the vendors of this fuel.

A Change of Address.

As the Government is requiring such a large number of Simms magnetos, the manufacturers of these instruments, Messrs. Simms Motor Units, Ltd., have moved their headquarters into larger and more extensive premises at Percy Buildings, Gresse Street, Rathbone Place, London, W.

Morgans Obtainable.

Provided a prospective buyer can obtain a permit from the Ministry of Munitions to purchase a new motor vehicle, the Morgan Motor Co., Ltd., of Malvern, are in the happy position of being able to execute such orders immediately, as we understand that the company has in stock at least 200 complete sets of parts of standard models.

Facts about Welding.

We have received a brochure from Barimar, Ltd., 10, Poland Street, Oxford Street, London, W., entitled "Straight Facts about Welding," written by Mr. C. W. Brett, the managing director of this firm. The brochure shows how apparently hopeless fractures of almost every kind of metal have been made good by acetylene welding. Copies of the booklet will be sent free on application.

C.A.V. Magnetos.

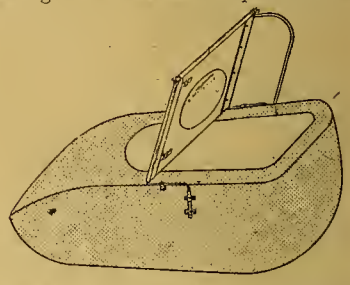
The manufacturers of the C.A.V. magnetos, Messrs. C. A. Vandervell and Co., Acton Vale, London, like many other firms, are not compiling a large catalogue at present, but are sending out instead brochures giving in concise form a description of the Type "3U1" for single-cylinder engines up to 4½ h.p., and Type "3U2" for engines up to 4½ h.p. firing at 180°. Another booklet enumerates the spares of these two magnetos, giving reference number and price, and is a useful list to keep at hand.

Review.

"The P. and M. in the Making" is an attractive booklet published by Messrs. Phelon and Moore, Ltd., Cleckheaton, Yorkshire, describing the manufacture of the famous P. and M. from A to Z. The book begins with an introduction stating that it is not practicable to produce a catalogue during the continuance of the war. It then goes on to show the various processes employed in the construction of the machine, beginning with the cylinder, then taking the reader gradually through the manufacture of the whole motor bicycle. The processes are briefly explained and clearly illustrated by high-class blocks. An interesting fact dealt with is the testing of the cylinder, which is subjected to a pressure of 400 lb. per square inch. After he has perused the booklet, the reader will cease to wonder why the Royal Flying Corps has adopted the P. and M. exclusively.

A Sidecar Screen.

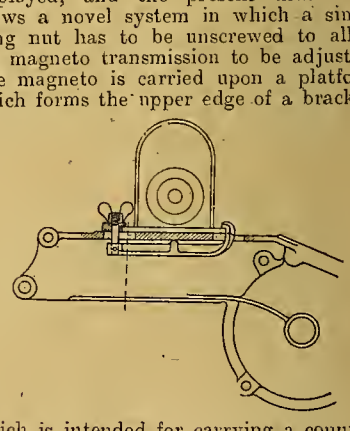
By this invention there is provided a simple form of windscreen which can be adapted to various sidecars, and which will occupy little room when not in use. The screen frame comprises an upright at each side connected by a cross-bar. The screen itself may be made of flexible waterproof material, such as hood cloth, into which is let a window of celluloid. One edge of the screen is provided with



spring buttons and eyelets, whilst the other has attached to it straps and buckles. Thus one edge is attached by means of the quick-spring fastenings, whilst the buckles afford an adjustment at the other edge, so that the screen may be drawn taut when in position.—W. E Boyce, No. 102,848.

Magneto Adjustment.

On motor cycles the magneto is usually held in position by four studs, so that adjustment or removal is not an easy matter. There are, however, one or two instances of alternative fastenings being employed, and the present illustration shows a novel system in which a single wing nut has to be unscrewed to allow the magneto transmission to be adjusted. The magneto is carried upon a platform which forms the upper edge of a bracket,



which is intended for carrying a countershaft gear box. Beneath the platform is arranged a lever, which is provided at its centre with a fulcrum block, and at one end with a claw. This claw passes up through the platform and engages a plate which carries the magneto. From the other end of the lever projects a stud, on which the securing wing nut is screwed.—C. G. B. Sangster, No. 102,913.

BOWDEN WIRE LTD LONDON

ESTABLISHED 1897

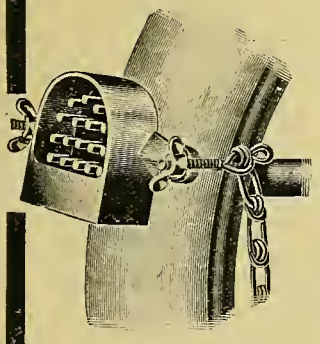
BOWDEN Wire, Limited, being wholly engaged upon production for the British and Allied Governments, are unable to execute any orders for private purposes until further notice They have in stock certain goods suitable for replacements. Customers are invited to state their requirements in this respect, and, if possible, these will be met

VICTORIA ROAD, WILLESDEN JUNCTION, N.W.

Godbolds

Simms Vulcaniser

can be used by anyone, anywhere.



Don't wait until you are stranded in the open country with a burst tyre, but get a Simms Vulcaniser today, for then you will be able to repair with the greatest ease and with certainty, burst or puncture. Mind you, skill is not required, as Simms Vulcaniser is automatic.

Price for covers and tubes . . **24/-**
Small size for inner tubes only **15/-**

SIMMS MOTOR UNITS, LTD.,
FERCY BUILDINGS, GRESSE STREET, RATHBONE PLACE, LONDON, W.
And Dealers everywhere.

I SUBMIT there

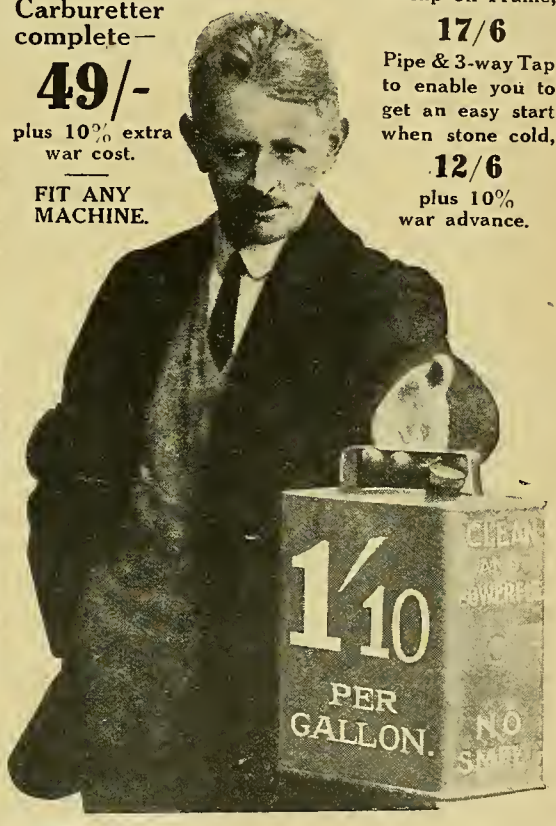
is a solid reason why you should adopt a BINKS CARBURETTER, viz.: YOU CUT YOUR FUEL BILL IN TWO

if you adopt my system and use my fuel. You can, of course, use petrol or benzol without alteration.

Price of Carburetter complete—
49/-
plus 10% extra war cost.

FIT ANY MACHINE.

Small extra Tank to clip on Frame,
17/6
Pipe & 3-way Tap to enable you to get an easy start when stone cold,
12/6
plus 10% war advance.



READ!

MY 3-PHASE JET DAMPING CARBURETTERS have such perfect vaporising properties that they enable you to use fuel at **1/10** per gallon in 42-gallon casks, which you are allowed to keep on your premises. Casks **12/6** each, returnable at **10/-** each. Your engine will tick over dead slow, and pull dead slow in traffic, yet give the full power. It is almost impossible to tell you are not running on petrol at **3/-** a gallon. It cannot damage your engine or soot it up, and makes Motor Cycling possible in these times.

I give you my personal assurance of the truth of what is stated above. Please send at once for full particulars of the carburetter, and also for my Treatise on Carburation, and terms of One Month's Approval Trial.

Owners in London invited to apply to Messrs. Oylers, Ltd., of 35, New Cavendish Street, who have facilities for supplying and fitting these carburetters.

C. BINKS, Ltd., Eccles.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., & Co., and crossed

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed, "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged, when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.B.C.

A.B.C., 1914, T.T., 5-speed countershaft, spring frame; £48 for quick sale.—Box 748, c/o *The Motor Cycle.* [X6813

Abingdon.

ABINGDON, 3½h.p. (1912), free engine, footboards, etc., perfect; £14.—Smith, 199b, King St., Hammersmith. [8690

3½h.p. Abingdon, 2-speed, free engine, handle start, speedometer, lamps, etc., perfect order; £20.—F. Ratcliff, Goudhurst, Kent. [8617

A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [X5924

A.J.S. 4h.p. Combination, direct from makers.—W. Brandish, Triumph Garage, Foleshill Rd., Coventry. [X5986

A.J.S., 6h.p., 1915, best A.J.S. sidecar, speeds, hood, wind screen, really good; £80; extended payments arranged.—Service Co., 292, High Holborn, London. [X6714

A.J.S. Late 1915 6h.p. Combination, perfect, externally and internally, hood, screen, apron, spare wheel, Lucas lamps, horn, speedometer, spares, used with care, and only week-ends; owner joining up; £90, or nearest offer.—Lindley, Jeweller, Bedford. [X6803

NEW MODELS FROM STOCK.

ALLON, 2-stroke, 2-speed	42 gns.
B.S.A., 4½ h.p., 3-speed, chain drive	£66 0
B.S.A., 4½ h.p., 3-speed, model K	£64 0
CALTHORPE, 2-stroke, 2-speed	33 gns.
CALTHORPE-J.A.P., 2¾ h.p., 2-speed	38 gns.
ENFIELD, 2-stroke, 2-speed	42 gns.
ENFIELD, 3 h.p., twin, 2-speed	55 gns.
ENFIELD, 6 h.p., Combination	90 gns.
ENFIELD, 6 h.p., Combination, with Lucas dynamo lighting set	105 gns.
JAMES, 2-stroke, 2-speed	£42 0
JAMES, 3½ h.p., twin, 3-speed	£69 0
JAMES, 4½ h.p., Combination	£86 0
LEVIS Popular, 2½ h.p., 2-stroke	£32 0
NEW IMPERIAL, 2½ h.p., 2-speed	39 gns.
NEW IMPERIAL, 2½ h.p., 2-sp., clutch and kick-starter	46 gns.
ZENITH-GRADUA, 3½ h.p., twin	£62 0

EXCHANGES

We specialise in exchange transactions, and will allow full value for your old Motor Cycle or Light Car in Part Payment for any new one.

SECOND-HANDS.

The following is a selection from our large stock of machines of all types:

CLYNO, 1914, 6 h.p. Combination, Lucas electric lighting set, speedometer	£68 0
JAMES, 1915, 2¼ h.p., 2-stroke, 2-speed, Lucas lamp set, rear lamp and horn	£33 0
ALLON, 1915, 2¾ h.p., 2-stroke, 2-speed	£33 0
MATCHLESS, 1913, 8 h.p., 2-speed, clutch, & kick-starter, all accessories	£38 0
ZENITH, 1913, 3½ h.p., Gradua gear	£30 0
CALTHORPE, 1915, 2¼ h.p., 2-stroke, 2-speed, headlight, rear lamp, horn, and speedometer	£28 0
VINDEC, 1911, 5 h.p., 2-speed, headlight, rear lamp, horn and coachbuilt Sidecar	£22 0
DOUGLAS 1915 2¾ h.p. War Office model	£50 0
TRIUMPH, 1914, 4 h.p., 3-speed	£40 0
JAMES, 1916, 2¾ h.p., 2-stroke, 2-speed, lamps, and horn	£36 0
ROYAL ENFIELD, 1914, 3 h.p., twin, 2-speed	£32 0
DOUGLAS, 1910, 2¾ h.p., lamps and horn	£15 0
CALTHORPE-J.A.P., 1915, 2¾ h.p., 2-sp., lamps and horn	£30 0
NEW IMPERIAL-J.A.P., 2½ h.p., T.T. model, 2-speed, Cowey speedometer	£33 0
ALLON, 1916, 2¾ h.p., 2-stroke, 2-speed, Lucas lamps, and horn	£38 0
ARNO, 1916, 3½ h.p., T.T. model, lamps, and horn	£33 0
ALLON, 1915, 2¾ h.p., 2-stroke	£25 0
CALTHORPE-J.A.P., 1915, 2¾ h.p., 2-sp.	£27 0
TRIUMPH, 1912, 3½ h.p., Bowden countershaft 2-sp. gear, clutch, and kick starter	£28 0
MATCHLESS, 1915, 7 h.p., Combination, M.A.G. engine, 3-speed and clutch, Lucas lamp and horn, speedometer and watch	£73 0
RUDGE, 1913, 3½ h.p., 2-sp., lamps, horn, mirror, new coachbuilt Sidecar	£35 0

Deferred Payments accepted for either New or Second-hand Goods.

EASTERN GARAGE CO.,

Official Repairers to R.A.C., A.C.U., A.A. & M.U.

418, Romford Rd., Forest Gate, E.

Telephone: 490 East Ham.
Telegrams: "Egaraco. London."

MOTOR CYCLES FOR SALE.

Alldays.

1917 Allon, 2-speed, in stock.—Pickering, Mardol, Shrewsbury. [X6779

1915 Allon, 2¾h.p., 2-speed, E.I.C., Senspray; £27/10.—Railway Garage, Staines. [8631

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

1916 Alldays Allon, 2-speed, and clutch, electric lamps, new condition; £37.—Ross, 86, High Rd., Lee. [8650

1916 Allon, 2¾h.p., 2-stroke, 2-speed, ridden about 500 miles; £36, or near offer.—Cricketers' Hotel, Clarence Rd., Clapton, N.E. [8593

ALLDAYS Matchless, 2½h.p., 2-stroke, perfect, mileage 1,000, accessories; £25.—Ellison, Inversnaid, Hall Rd. West, Blundellsands. [X6761

1917 Alldays Allons for immediate delivery; cash, extended payment, or war loan stocks.—Jones, Garage, Broadway, Muswell Hill. [8766

ALLON.—All 1917 models in stock, 36-45 gns.; exchanges and deferred payments arranged.—Maudes', 100 and 136 Gt. Portland St., London, W. Tel.: 552 Mayfair. [7387

Ariel.

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

ARIEL, 3½h.p., variable gear, new tyres, perfect order; £24, or near offer.—Gilbert, 30, Edgemont Gardens, Langside, Glasgow. [X6431

1917 Ariels; immediate delivery of 5-6h.p. and 3½ h.p. solo or combinations, for cash, extended payments, or war loan stocks.—Jones, Garage, Broadway, Muswell Hill. [8765

ARIEL, the reliable motor cycle, 3½h.p. single, and 5-6h.p. twin models; delivery from stock.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0889

Arno.

ARNO, 2½h.p., Bosch, Druids, stand, carrier, and Grado gear, in first-class order and condition; £20.—Maxim, 31, Haiothorpe Rd., West Norwood. [0894

Auto Wheels.

AUTO-WHEEL, June, 1915, only used 6 weeks; nearest £7/10.—Brown, Colonial Rd., Slough. [X6662

AUTO-WHEEL, 1916, B.S.A. model, perfect condition, only used one month, together with cycle; accept £14/14.—3, Aubert Park, Highbury Park, London. [8716

AUTO-WHEEL, B.S.A. model, 12 gns.; also 1914 standard, £7/10; deferred terms if desired.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8605

Bat.

BATS.—P. J. Evans, John Bright St., Birmingham, Midland agent. Delivery from stock 4-5h.p. sporting model. [8696

BAT, 1912, 6h.p. J.A.P., T.T., 3 speeds, usual spares, excellent condition; £32.—P. J. Evans, John Bright St., Birmingham. [8700

3½h.p. Bat, late 1910, reground, new piston, rebushed, Grado gear and free, accessories; joining up; first M.O. £12.—Bat, 15, Thornton St., W. Hartlepool. [8643

BAT-J.A.P., 8h.p., 1914, 2 speeds, free engine, kick start, fitted with Gloria sprung wheel sidecar, and all accessories, in splendid running order; £50, or nearest offer.—Apply, St. George's Square Garage, Portsea. [X6706

Bradbury.

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage; £52/10.—Motor Exchange, Horton St., Halifax. [8344

2¾h.p. Bradbury, with wicker sidecar; will be sold cheap; owner gone to France.—Box L3,196, c/o *The Motor Cycle.* [8789

BRADBURY 1913-14 Combination, 4h.p., Bosch, 3 speeds; 29 gns.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [8262

BRADBURY, 3½h.p., 1913, 2-speed, and Millford sidecar, overhauled; £35; extended payments arranged.—Service Co., 292, High Holborn, London. [X6716

Brough.

1915 Brough, 4h.p., 2-speed, 1,000 miles, almost new, very fast; 47 gns.—245, Hammersmith Rd., London, W. [8625

1916 (November) Model H. T.T. 3½h.p. Brough Flat Twin, special engine, overhead valves, Sturmey-Archer 3-speed countershaft gear, clutch, kick starter, Cowey speedometer, Lucas lamps, all accessories, mileage under 400, fast, perfect condition, climb anything, Watsonian S6 sidecar to fit (never attached), full insurance till Oct., 1917; cost £90 (receipts shown), sell £66, or separately £60 and £7; consider 1916 Edmund, or other good lightweight in part exchange; owner ordered Overseas.—Box 734, c/o *The Motor Cycle.* [X6613

MOTOR CYCLES FOR SALE.

B.S.A.

B.S.A., 1917 models H and K, with sidecars, in stock. —Moss, Wem. [X6792

1917 B.S.A., chain drive; in stock.—Pickering, Mardel, Shrewsbury. [X6775

COLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

1915 B.S.A. Model K, in perfect order, as new; £43. —12, Midland Rd., Swadlincote. [X6765

B.S.A. 4½h.p. 1915 K Canoelet Sidecar Combination, excellent condition; £56.—Edwards, Glanyrafon, Haverfordwest. [X6601

B.S.A.'s.—Six 1917 models in stock; good allowances made for old machines. Secure one now.—Walsall Garage, Walsall. [X6606

B.S.A., 4½h.p., countershaft 3-speed, fully equipped, almost new condition; 39 gns.—245, Hammersmith Rd., London, W. [8627

B.S.A., 1916, all chain, overhauled, all accessories; £55; extended payments arranged.—Service Co., 292, High Holborn, London. [X6715

B.S.A., 3½h.p., 1913, 2-speed, in splendid order; £38, a bargain; complete with all accessories.—Hammond, St. Nicholas, Ipswich. [8573

B.S.A., 1917 H and K Models in stock for immediate delivery; exchanges entertained.—Eagles and Co., High St., Acton, London. [X6748

1912 Clutch Model B.S.A., and accessories, in very good condition; £24; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [8575

LATE 1915 B.S.A. Model K Turnout, splendid condition, equal to new, complete with lamp, horn, etc.; £65.—The Raleigh Cycle Co., Oxford. [X6427

B.S.A., 1913, clutch model, coachbuilt sidecar, first-class condition; £35, or offer, officer must sell.—180, West End Lane, West Hampstead, N.W. [8649

1917 B.S.A.'s, Models H and K actually in stock; cash, exchanges, extended payments, or war loan stocks.—Jones, Garage, Broadway, Muswell Hill. [8767

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529

B.S.A., 1916, 4½h.p., chain drive, countershaft 3-speed, lamps, horn, etc., just overhauled, in tip-top condition; £54.—90, Bloomfield Rd., Woolwich. [8579

B.S.A., 3½h.p., 1912 free engine model, with T.T. handle-bars, excellent condition, new appearance; £26/10.—Eagles and Co., High St., Acton, London. [X6746

B.S.A., 4½h.p., 1915 model K, 3-speed countershaft gear, with Millford Corvette sidecar to match, accessories; £57.—Eagles and Co., High St., Acton, London. [X6745

B.S.A., 1914, 3½h.p., 3-speed gear box, kick starter, chain-cum-belt drive, complete with sidecar, all lamps, accessories, in perfect order; 55 gns.—Hammond, St. Nicholas, Ipswich. [8572

B.S.A., 3½h.p., 1912-13, free engine model, Dunlop heavy tyres (unscratched), N.S.U. 2-speed gear, with adjustable pulley, accessories; £30.—Eagles and Co., High St., Acton, London. [X6747

B.S.A., late 1916, 4½h.p., 3 speeds, kick-starter, and coachbuilt sidecar, cost £76, run 400 miles, guaranteed indistinguishable from new; £56.—Percy and Co., 337, Euston Rd., London. [8795

B.S.A., 1916, 4½h.p., 3-speed gear box, kick starter, chain-cum-belt drive, complete with 15 gn. sidecar, with screen, lamps, horn, tools perfect order; 65 gns.—Hammond, St. Nicholas, Ipswich. [8571

B.S.A., new 4½h.p., 3-speed countershaft Model K, chain-cum-belt drive, in stock; £64; your present machine can be taken as part payment.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0551

1913 B.S.A. 2-speed, two in stock, belt drive, also one chain drive, £30 each; deferred payments arranged. All machines advertised by me have been thoroughly overhauled and guaranteed value for money. —Jones, Garage, Broadway, Muswell Hill. [7700

Calthorpe

CALTHORPE, 1915, 2½h.p. J.A.P., Enfield 2 speeds, guaranteed equal to new; £23.—Below.

CALTHORPE, 1914, 3½h.p., 3 speeds, new coachbuilt sidecar, speedometer; £34.—Percy and Co., 337, Euston Rd., London. [8798

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799

CALTHORPE, 2¾h.p. J.A.P., Enfield 2-speed gear, 1915, grand condition; £26.—Dunn, 35, Lyttelton Rd., Leyton. [8585

1917 Calthorpe, 2-stroke, 2-speed, new; also 1915 Calthorpe-Jap, second-hand, £26.—Pickering, Mardol, Shrewsbury. [X6778

CALTHORPE 2¾h.p. J.A.P., 1915, new tyres; £25; seen in London by appointment.—Westlake, Hadley Highstone, Barnet. [X6758

1915 Calthorpe-Jap, 2¾h.p., Enfield 2-speed; £25; pay cash adjustment for big single or twin (solo or combination).—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [8681

P. J. EVANS, Birmingham and District Agent.—Calthorpe 1917 models in stock; two-stroke and four-stroke lightweights, and 4-5h.p. twins, solo or as combination.—John Bright St. [8697

MAUDES MOTOR MART

SECOND-HAND BARGAINS

SIDECAR OUTFITS.

TRIUMPH, 3½ h.p., 2-speed countershaft, Sidecar ... £30
ZENITH, 1914, 6 h.p., countershaft clutch model £50
RUDGE, 1913, 5-6 h.p. Multi, with Rudge Sidecar £40
ENFIELD, 6 h.p., 2-speed, twin, Enfield Sidecar £29
RUDGE, 1913, 3½ h.p. Multi, coach-built Sidecar *£30
SCOTT, 1914, 3½ h.p., 2-sp., and Scott sidecar £47
ZENITH, 1915, 3½ h.p., twin, clutch, and C.B. Sidecar £45
P. & M., 3½ h.p., 1913, 2-speed, C.B. Sidecar *£40
JAMES, 4½ h.p., 1914, 3-speed, Empress Sidecar *£45
SUNBEAM, 1915, 3½ h.p. Combination *£68
SUNBEAM, 1916, 3½ h.p. Combination £77
ZENITH, 1914, 8 h.p., clutch, and Sidecar *£60

LIGHT CARS.

G.W.K., 1914, 8 h.p., just re-painted £120
KNIGHT Junior, 1914, 11.9 h.p., sporting body *£145
SINGER, 10 h.p., 5 lamps, just being overhauled *£135
SINGER, 1913 (late), 5 lamps, dickey *£140
HILLMAN, 1915, 9.5 h.p., speedometer, little used.*£215
MATHIS, 1914, 15 h.p., 5-seater, dynamo .....*
DAIMLER 38 h.p. Landaulette, C.A.V set.....*
SWIFT, 1915, 10 h.p., dynamo, like new.....*£250
BELSIZE, 1912, 10-12 h.p., dynamo *£135
FORD, 1913, 20 h.p., 5-seater, windscreen £60
MORGAN, 1913, 8 h.p., hood and screen..... *£60
CALTHORPE, 1916, 10 h.p., 4-seat, dyna. and start £265
CALTHORPE, 1916, 10 h.p., 4 seat, dyna. and start £275
A.C., 1915, 10 h.p., dynamo, luxurious finish £275
HUMBERETTE, 8 h.p., 1913, wants overhauling £36

SOLO MOUNTS.

DOUGLAS, 1914, 2¾ h.p., 2-speed, T.T. *£35
DOUGLAS, 1915, 2¾ h.p., 2-speed, model V.....*£45
DOUGLAS, 1914, 2¾ h.p., 2-speed *£40
DOUGLAS, W. O., 1916, 2¾ h.p., 2-speed.....*£50
TRIUMPH, 1912, 3½ h.p., clutch model, Bosch *£25
TRIUMPH, 1914, 4 h.p., 3-speed, Bosch.....*£40
TRIUMPH, 1912, 3½ h.p., Standard touring *£22
TRIUMPH, 1913, 3½ h.p., 3 speed, all accessories ...*£30
TRIUMPH, 1914, 4 h.p., 3-speed (late date) *£42
TRIUMPH, 1909, 3½ h.p., delivered 12.12.08 .....*£17
TRIUMPH, 1914, 4 h.p., 3-speed, electric horn *£41
INDIAN 1914, 7-9 h.p., clutch model, speedometer .*£40
INDIAN, 3½ h.p., 1915, 3-speed, speedometer £38
INDIAN, 1914, 7-9 h.p., T.T. model, very fast *£36
B.S.A., 1916, 4½ h.p., 3-speed, mod. K., speedometer*£54
ENFIELD, 1911, 2¾ h.p. twin, 2-speed, chain drive..*£20
ENFIELD, 1911, 2¾ h.p twin, Grado gear *£14
HUMBER, 1914, 2¾ h.p. twin, light touring machine*£17
HUMBER, 1914, 3½ h.p. 3-speed, water-cooled *£38
CALTHORPE, 1914 (late), 2½ h.p., 2-sp., 2-str. *£22
IVY, 1915, 2½ h.p., 2-stroke, Senspray carburetter £12
REX, 1914, 4 h.p., 2-speed, and handle start £25
PREMIER, 1913, 2½ h.p., single-cyl., fine lightweight .. £12
F.N., 1912, 2¼ h.p., 2-speed, shaft drive £12
RADCO, 1916, 2 h.p., single-speed, almost new £20
CALTHORPE, 1914, 2 h.p., 2-speed, 4-stroke £15

Machines starred (*) are complete with lamps, horn, etc

NEW 1917 MODELS.

ROYAL ENFIELD, 2¼ h.p., 2-speed, 2-stroke £44 2
B.S.A., 4½ h.p., 3-speed, belt, K, 1917 model £84 0
B.S.A., 3½ h.p., Model D. T.T. £52 10
ROVER, 1917, 3½ h.p., T.T., Philipson pulley ... £61 10
HARLEY-DAVIDSON, 7 h.p., 17F, 3-speed £93 0
HARLEY-DAVIDSON, 7 h.p., 17J, electric equip...£102 0
HARLEY-DAVIDSON Sidecar to either of above.. £24 10

NEW 1916's (Note Reduced Prices).

ROYAL RUBY, 2½ h.p., 2-speed, J.A.P. engine.... £33 14
ROYAL RUBY, 2½ h.p., 2-speed, 2-stroke £32 5
ROYAL RUBY, 2½ h.p., J.A.P., single-speed £28 15
COVENTRY EAGLE, 2½ h.p., single-speed, 2-stroke £30 15
LEVIS 2 h.p. Popular model £29 0

MAUDES MOTOR MART

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MOTOR CYCLES FOR SALE.

Calthorpe

CALTHORPE-J.A.P., 1917, latest model, Enfield 2-speed, just arrived from works, 38 gns.; also one just slightly soiled, 36 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [8598

CALTHORPE, 2-stroke, 1917, latest model, Enfield 2-speed, 33 gns.; just arrived from works; also one just slightly soiled, 31 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [8599

CALTHORPE-J.A.P.'s, 2-speed models in stock, 38 gns.; deferred terms if desired; also 1915 2-speed and accessories, fine order, £27/10; deferred terms if desired.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8606

CALTHORPE-J.A.P., Enfield 2-speed, Senspray, T. and H., and Lucas lamp sets, Lucas horn, mirror, spare new chains, in exceptionally good order, climb anywhere; genuine bargain, £25/10, or offer.—Park Farm, Oddingley, Droitwich. [X6664

Campion.

1916 Campion 6h.p. Combination; £90; as new.—47, Newland Av., Hull. [X6688

1915½ 6h.p. Campion-Jap Combination, C.B. sidecar, 3-speed Sturmey-Archer gear box, chain-cum-belt, 3 lamps, spares, perfect condition; £60, cost £100. —4, St. Saviour's Rd., Leicester. [X6604

Carlton.

CARLTON Coachbuilt Combination, 8h.p. twin, 2-speed, Bosch mag., B.B. carburetter, splendid condition; £30.—L3,192, c/o *The Motor Cycle.* [8638

Centaur.

CENTAUR, 3½h.p., nearly new Dunlop tubes, tyres, handle-bars, and accumulator, Dermatine belt, footboards; £7; engine worth money.—Gowens, 99, Pont St., Ashington. [X6798

Chater-Lea

CHATER-LEA, 5h.p. twin, 15 gns.; sidecar, £3.—Miss May, 66, Greyhound Lane, Streatham, S.W. [8738

CHATER-LEA, 2¾h.p., 1915 Villiers engine, 2-speed countershaft gear, T.T. handle-bars; £26/10.—Eagles and Co., High St., Acton, London. [X6743

CHATER-LEA, 1915, 8h.p. twin Precision, 3 speeds countershaft, chain drive, exceptional nice coachbuilt sidecar, hood, speedometer, lamps, car tyres, large pan seat; cost £105, accept £45.—Percy and Co., 337, Euston Rd., London. [8794

Chater-Fafnir.

CHATER-FAFNIR, 3½h.p., 2-speed, free engine, just overhauled; £18.—Somny, Callowdene, Milton Rd., Hanwell, London. [8565

Clyno

CLYNO 1912 6h.p. Combination, £35/10; Clyno, 6 h.p., 3 speeds, £24/10.—Motor Exchange, Horton St., Halifax. [8345

CLYNO Combination, abundance of spares, 5 gn. speedometer; £47/10.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8667

1917 New Clyno Combination (spare wheel), fitted for petrol or paraffin; price and machine right.—Potter, Agent, Leicester Grove, Leeds. [X6755

CLYNO, 1914, No. 6 sidecar, recently overhauled, guaranteed; £65; extended payments arranged.—Service Co., 292, High Holborn, London. [X6717

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

CLYNO, 5h.p., 3-speed countershaft, detachable wheels, spare wheel, 2 or 1-seated coachbuilt sidecar, engines and gears in good condition; £45.—10, Bartholomew St., Ipswich. [8726

1914 Clyno Combination, 3 speeds, clutch, kick starter, new tyres, spare wheel, wind screen, splendid condition, overhauled, all accessories; £52, or nearest.—Lieut., Norfolk Hotel, Arundel. [8762

Connaught.

BIRMINGHAM Agent, P. J. Evans, John Bright St.—1917 models of the famous Connaught two-stroke, standard 2¾-3h.p. models, either solo or with sidecar; miniature models, single or 2-speed countershaft gear; prices from 27 gns. [8895

Coventry Eagle.

COVENTRY Eagle, 1915, single speed, guaranteed condition; £20; extended payments arranged.—Service Co., 292, High Holborn, London. [X6718

COVENTRY Eagle, 1916, Trump, 2 speeds, guaranteed as new, run 100 miles only; cost £49, accept £33.—Percy and Co., 337, Euston Rd., London. [8803

Dayton.

DAYTON 1914 Lightweight, mag., only ridden 300 miles; £16/16.—1, Ebner St., Wandsworth. [8263

Douglas.

DOUGLAS, 1915, 2¾h.p., T.T., overhauled and re-enamelled; £44.—Below.

DOUGLAS, 1911, 2¾h.p. twin, single speed, re-enamelled and overhauled throughout; £18.—Below.

DOUGLAS, 1914, 2¾h.p., clutch, lamps, horn, speedometer, tools, overhauled; £40; extended payments arranged.—Service Co., 292, High Holborn, London. [X6721

MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS 1915 4h.p. Combination, practically new; £60.

DOUGLAS, 1914, 4h.p., in nice order; £38.

DOUGLAS, 1915, 2¾h.p., in nice order; £40.

DOUGLAS, 1913, 2¾h.p., in nice order; £23.—Percy and Co., 337, Euston Rd., London. [8796

DOUGLAS, 1915, 2¾h.p., 3-speed Model U; £48.—25, Ormiston Rd., W. [8547

1912 Douglas, 2-speed, and clutch; a bargain, £25.—Ross, 86, High Rd., Lee. [8652

1914 Douglas, complete, Lucas lamps, etc.; £35.—Cross, Jeweller, Rotherham. [X6709

DOUGLAS, 1913 T.T., 2¾h.p., 2-speed, tyres as new; 32 gns.—Railway Garage, Staines. [8632

1915 Douglas, 2¾h.p. Colonial Model, lamp and horn; bargain, £44.—George, 23, South Parade, Chelsea. [8616

1912 2-speed Douglas, new in 1913, good order; £20.—Particulars, Girvin, Congest, Galway. [X6797

DOUGLAS, 1914, 2-speed, T.T. bars, all on, very fast; £32.—97, Malvern Rd., West Kilburn. [8759

DOUGLAS, 1914, 2¾h.p., T.T. model, with accessories; £42/10.—Motor Exchange, Horton St., Halifax. [8346

1911 Douglas, 2¾h.p., splendid condition, new tyres, belt; £15; any trial.—Nixon, Brampton, Cumberland. [X6808

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Yeovil. Tel.: 50. [5855

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

DOUGLAS, 2¾h.p., 2 speeds, clutch, kick starter, lamps, horn, spare tank; bargain, £29/10.—The Walsall Garage, Walsall. [X6608

DOUGLAS, 2¾h.p., fine order, new tyres, plating, enamelling new, only wants seeing; £17.—14, Dodbrooke Rd., West Norwood. [0869

1910 Douglas, Bosch, Druids, powerful; £12; exchange 2-stroke or Precision Junior.—Bolsover. Bryn-Lupus Lodge, Llandudno. [X6705

1913 T.T. Douglas, 2¾h.p., 2-speed, tyres and belt as new, thoroughly overhauled throughout; 30 gns.—Railway Garage, Staines. [8545

1915 2¾h.p. 2-speed Douglas, and accessories, in good condition; £42/10; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [8576

DOUGLAS, single-speed, a.i.v., good tyres, in good mechanical condition, £15; also Grado Multi pulley, as new, £2/10.—Bulgarelli, Manchester Rd., Swindon. [X6658

DOUGLAS, 2¾h.p., T.T. Model, 1913-14, re-enamelled and plated, overhanled, new tyres; £35; accessories.—Eagles and Co., High St., Acton, London. [X6740

DOUGLAS, 1916, like new, Watford, Stewart horn, College shields (detachable), rests, and footboards, Lucas rear and spares; £52/10. Higson, Charles St., Sheffield. [8442

DOUGLAS W Model, 1915, bought new 1916, 2¾h.p., 3-speed, lamp, speedometer, spares, just overhauled; £45, or nearest offer; owner going Overseas.—Mc.Naught, Worcester. [8577

DOUGLAS, late 1914, 2¾h.p., 2 speeds, kick start, lamps, horn, and speedometer, new tyres and belt, just thoroughly overhauled; £40.—Tilley, The Esplanade, Weymouth. [X6804

DOUGLAS, 2¾h.p., Model U, 1915, 3-speed gear, footboards, upturned or touring bars, lamps, horn, speedometer, in perfect order; £45.—Robinson's Garage, Green St., Cambridge. [8744

DOUGLAS, 2¾h.p. (late 1915), splendid condition, all accessories; owner going on active service.—Apply, A. Hall, Wallfield, Whitefield Rd., Stockton Heath, near Warrington. [8557

DOUGLAS, 2¾h.p.—Brand new Models W (clutch, kick start) and U; deliveries in few days to doctors and farmers. Write for particulars.—Robinson's Garage, Green St., Cambridge. [8745

DOUGLAS, 1913, 2¾h.p., 2-speed, tyres nearly new, P. and H. head lamp and generator, rear lamp, horn, spare belt and tube case; £34.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [8601

DOUGLAS, Model W, new December, 1915, clutch, kick-start, 2 Lucas lamps, horn, complete kit tools, pump, under 1,000 miles, excellent condition; £53/10.—Robinson's Garage, Green St., Cambridge. [8743

1915-16 Douglas, T.T. Colonial Model V, special finish, picked engine, recently purchased, practically new, all accessories, nothing better; first cheque £48 secures.—Albert, 23, Market Place, Kingston, S.W. [8658

LATE 1915 Douglas 2-speed T.T. Colonial Model, all black, large, long extended exhaust pipe, Lucas horn, P. and H. head (large), rear lamp, etc., foot board or foot-rest optional, in real good order, guaranteed perfect; £45.—Jones, Garage, Broadway, Muswell Hill. [8768

LAMB for 1917 Models

ACTUALLY IN STOCK.

4½ h.p. **B.S.A.**, chain drive	£66 0
4½ h.p. **B.S.A.**, belt-cum-chain	£64 0
2¼ h.p. **ENFIELD**, 2-speed, 2-stroke	£44 2
3 h.p. **ENFIELD**, 2-sp. and Canoelet S/car	£68 3
6 h.p. **ENFIELD** Standard Combination (2-seater, £3 extra)	£94 10
7-9h.p. **HARLEY-DAVIDSON**, genuine 1917 Standard	£93 0
7-9h.p. **HARLEY-DAVIDSON**, 1917, elec. model	£102 0
2½ h.p. **LEVIS**, Model E, 2-sp. Enfield gear, rustless rims	£47 10
2½ h.p. **LEVIS**, Popular model	£32 0
3½ h.p. **ARIEL**, 3-sp., solo, kick-start	£68 10
2¾ h.p. **CALTHORPE-J.A.P.** 2-sp. feather-weight, 3 models in stock	£39 16
2¼ h.p. **NEW HUDSON**, Model C, 2-speed	£35 9
7-9h.p. **HARLEY-DAVIDSON**, Mod. 16F, and Sidecar, 1916 model	£102 9
2½ h.p. **ROYAL RUBY**, single-speed	£47 5
2½ h.p. **ROYAL RUBY**, 2-speed	£40 0
2½ h.p. **ROYAL RUBY**, 2-speed J.A.P.	£46 0

(7 models in stock).

SECOND-HANDS.

6 **ENFIELD** 1916 Combination, speedometer, lamps	£85 0
6 h.p. **ENFIELD** 1916 Comb., scarcely used, with accessories	£88 0
6 h.p. **ENFIELD** 1916 Tradesman's Outfit, as new	£90 0
3 h.p. **ENFIELD** Touring Model, 2-sp.	£45 10
ENFIELD 1916, Commercial Box Carrier	£12 12
2¼ h.p. **CONNAUGHT**, 1916, only shop-soiled, lamp, horn	29 10
T.D.C., 1916, 2-sp., original tyres still on, spare tank	£28 0
2½ h.p. **ALLDAYS ALLON**, 2-sp., clutch, all accessories	£36 10
2½ h.p. **COVENTRY EAGLE**, 2-sp., 2-str., special price	£39 10
2½ h.p. **JUNO-VILLIERS**, 1916, all access., mileage about 100	£33 10
4½ h.p. **JAMES**, 1915, 3-sp., kick-start, lamps, horn	£57 10
7-9h.p. **HARLEY-DAVIDSON**, Mod. 16F, Canoelet Sidecar, and accessories	£89 10
2½ h.p. **ALLDAYS ALLON**, 1915, single-speed, and accessories	£27 10
1 h.p. **AUTO-WHEEL**, B.S.A. model	£7 10
1 h.p. **AUTO-WHEEL**, Standard model	£12 12
2¾ h.p. **CALTHORPE-J.A.P.**, 1915, 2-sp., and accessories	£27 10
2½ h.p. **LLOYD-VILLIERS**, 1916, single-speed, with lamp, horn	£31 0
2½ h.p. **O.K. JUNIOR**, 1916, 2-sp., tail lamp, Miller lamp, horn	£28 10
4 h.p. **TRIUMPH**, 1914, 3-sp., and coach Sidecar, with accessories	£38 10
2¾ h.p. **A.J.S.**, 1914, 2-sp., with lamp, horn, speedometer	£38 10
4 h.p. **TRIUMPH**, 1914, 3-sp., with lamp, horn, speedometer	£42 10
2¾ h.p. **NEW HUDSON**, 1912, 3-speed J.A.P., lamps, horn	£18 10
G.K. **HARLEY-DAVIDSON** Sidecar, simply shop-soiled	£14 10
2 **ENFIELD** Commercial Sidecars, each	£15 15
PHOENIX Sidecar, with wind-screen, coach-work excellent order	£7 10

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Douglas.

DOUGLAS Specialists.—Gibb, Gough, London Rd. Gloucester. Gibb, the International Douglas rider winner of numerous cups and gold medals. [2218

Dreadnought.

DREADNOUGHT, 1915, 2¾h.p., by Lloyds Motor Co., Villiers engine, 2-speed gear box, speedometer, lamps, horn, tools, condition perfect, tyres as new.—60, Mayfield Rd., Sanderstead, Surrey. [X6022

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012

PETROL Free with 1917 Edmund-Jap, Enfield gear and clutch, spring frame, equipped, mileage 100; 39 gns. Troward's, 78, High St., Hampstead. [8677

Elswick.

ELSWICK, 1914, 3¾h.p. Precision engine, Armstrong 3-speed, coachbuilt sidecar, also tradesman box for same; £40.—Hawkins, 356, St. Ann's Rd., Harringay. [8720

Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2¼h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

1915 Enfield Combination, condition like new; £67.—Ross, 86, High Rd., Lee. [8651

ENFIELD, 3h.p., done 120 miles only, unscratched, speedometer; £52/10.—Below.

ENFIELD 3h.p. Twin, 1914, guaranteed; £38/10.—Service Co., 292, High Holborn, London. [X6723

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

6h.p. New Enfield Combinations from stock; 90 gns.—Wauchope's, 9, Shoe Lane, London. [8672

ENFIELD 6h.p. 1917 Standard Combination, £94/10 (2-seater sidecar £3 extra).—Lamb's (below).

ENFIELD 3h.p. 1917 Solo Model, T.T. and touring; £57/15.—Lamb's (below).

ENFIELD 1916 Commercial Combination, new 2 months ago, mileage 400, £90; also two standard combinations, with accessories, like new, £85 each.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169, and Hornsey 1956. [8607

1914 Enfield 6h.p. Coachbuilt Combination, in good condition, spares, etc.; £58/10.—J. H. Merritt, Knottingley. [X5808

ENFIELD Combination, complete, speedometer, 6h.p. 1916 model, new back tyre; £70.—Kidd, Shotley Bridge, Durham. [X6687

ENFIELD 1916 6h.p. Combination; a bargain, £69/17/6.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [8596

1913-14 Enfield Combination, coach sidecar, £57/10; 1912 Enfield, cane sidecar, £41/10.—Collier's Motories, Deal St., Halifax. [8347

ENFIELDS.—1917 model 6h.p. combination, 90 gns.; also 2¼h.p. 2-stroke, 42 gns.; in stock.—Williams, 19, Portland St., Cheltenham. [X6799

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock for immediate delivery.—See below.

1917 6h.p. Enfield Coachbuilt Combination, with apron and mat, 2 speeds, clutch and starter, 90 gns.; extra for hood and screen, £4/19; Lucas lighting set, 15 gns.—Below.

1917 3h.p. Enfield, solo or sidecar mount, 2 speeds, clutch, and kick starter; 55 gns.; sidecars from 7 gns.—Below.

1917 Enfield Two-stroke, 2¼h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright St., Birmingham. [8693

3h.p. Enfield, lamps, horn, speedometer, spares, complete equipment, very economical; £41.—Bunting, 174, Revelstoke Rd., Wandsworth. [8715

ENFIELD, 1916, 3h.p., lamps, horn, speedometer, mileage 2,000, new condition; buying combination; £46.—32, Steade Rd., Sheffield. [X6774

ROYAL Enfield, 1917 model, 2¼h.p., 2-stroke lightweight, in stock; £45.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0491

ENFIELD 6h.p. Combination, new, but slightly shop-soiled; special bargain, £86.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [8595

ENFIELD 1916¾ 6h.p. Combination, Lucas dynamo lighting set, hood, screen, ridden 400 miles, like new; 85 gns., bargain.—29, St. Leonard's St., Bow. [8689

1915 Enfield Coachbuilt Combination, in splendid condition, complete with lamp set, rear light, horn, College mudshields; accept £68.—Tom Hewlett, 38, Bloomfield Rd., Gloucester. [X6614

ROYAL Enfield, late 1916 3h.p. twin, 2-speed gear, chain drive, kick starter, Palmer cord tyres, only done a few hundred miles, and condition as new; owner called up; £42.—The Premier Motor Co., Aston Rd., Birmingham. [8751

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Enfield.

6 h.p. Royal Enfield Combination, 1915 or 1916 model, fitted with Lucas dynamo lighting set, Klaxon hooter, watch, speedometer, hood and screen, ready for the road; £85; guaranteed.—Wauchope's, 9, Shoe Lane, Fleet St., London. [8671

ENFIELDS.—1917 6h.p. combination, 90 gns.; 3h.p., 55 gns.; 2-stroke, £44/2; all models in stock, just arrived from works; immediate delivery. We are Enfield specialists.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [8597

ENFIELD, 1913, 6h.p., extra large coachbuilt sidecar (new 1916) combination, all mechanical parts guaranteed in exceptionally good condition, mileage under 6,000, Lucas King of the Road lamp and horn, Cowey speedometer, many spares; £45; write for photo and appointment.—80, Durley Rd., Stamford Hill, N. [8584

Excelsior.

ENGLISH Excelsior, 6h.p., splendid outfit, 1915; what offers?—Box 737, c/o *The Motor Cycle*. [X6617

AMERICAN Excelsior, 7-9h.p., 3-speed, clutch, kick starter, brand new, with Empire sidecar, almost new; £80; exchanges.—Service Co., 292, High Holborn, London. [X6713

1914 American Excelsior, 7-9h.p., clutch model, lamps, etc.; all complete, only had 12 months wear; owner in the Service; price £35; seen any time. —293, Portland Rd., S. Norwood, S.E. [8722

DELAYS Are Dangerous. Our stock is being rapidly reduced, and we shall shortly withdraw our present offer of a brand new late 1916 7h.p. 3-speed American Excelsior motor cycle, complete with special Montgomery coachbuilt sidecar enamelled to match, at £80 spot cash. The fastest sidecar machine on the road, and the finest value offered. To be obtained only from the Premier Motor Co., Aston Rd., Birmingham. [8750

Grippon.

GRIPPON, 2¼h.p., B. and B. carburetter, pedal starter, good tyres; £5.—Maxim, 31, Hamthorpe Rd., West Norwood. [0890

Harley-Davidson.

1915 Harley-Davidson, special brown model; £61.—Ross, 86, High Rd., Lee. [8656

HARLEY-DAVIDSON Combination, new, in stock.—Pickering, Mardol, Shrewsbury. [X6776

HARLEY-DAVIDSON Gloria Combination; £55; exchanges.—47, Newland Av., Hull. [X6690

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for immediate delivery 1917 Harley-Davidsons. [7863

1915 Harley-Davidson Combination, speedometer, Lucas lamps, perfect; £60.—Sphinx, 64, Wellgate, Rotherham. [X6257

1916 Harley-Davidson Combination, only done 1,000, equal new; first cheque £78/10.—Liquidator, 62, Lansdowne Hill, West Norwood. [8786

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802

LATE 1915 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0861

HARLEY-DAVIDSON Combination, August, 1915, 4,000 miles, Kumfort patent mudguards, well kept, speedometer, and Low generator; £70.—A. Upson, 35, High St., Maidenhead. [8332

1917 Harley-Davidsons.—We are now making immediate delivery of either electric or magneto models; no waiting (only limited number available).—Harley-Davidson Scottish Depot, 98, Gt. Western Rd., Glasgow. [X6675

PETROL Free with Harley-Davidson, 1915, 7-9h.p., 3-speed, clutch, kick start, overhauled, 49 gns.; 11J. dynamo lighting model, coach sidecar, new July, 1916, mileage 2,000, 69 gns.—Troward's, 78, High St., Hampstead. [8675

HARLEY-DAVIDSONS.—Immediate delivery; new magneto models, £84/15; several second-hand 1915 and 1916 combinations from £65; exchanges arranged. —Colmore Depots, 31, Renshaw St., Liverpool, and 211, Deansgate, Manchester. [0885

HARLEY-DAVIDSON, new 1917 models in stock; Model 17F, 7-9h.p., 3-speed, £93; also the last 1916 model, 7-9h.p., 3-speed Model 16F, £84/15, in stock; cash, exchange or deferred terms.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0552

1915 Model 11J 7-9h.p. 3-speed Harley-Davidson, dynamo electric lighting outfit, complete with special coachbuilt Gloria sidecar, enamelled to match, completely overhauled, appearance exactly as new; £75. —The Premier Motor Co., Aston Rd., Birmingham. [8753

LATE 1915 Harley-Davidson, 11F, 3-speed, fitted with special coachbuilt Canoelet 2-seated sidecar, child front, with hood and screen, like new, very little used, head light, rear light, generator, Stewart warning signal; £80.—Simister, 54, Whitegate Drive, Blackpool. [8729

HARLEY-DAVIDSON Model 11B, 4¼h.p., single-cyl., free engine, clutch, with hand and foot control, kick starter, 28×3in. Goodyear tyres, Stewart speedometer, lamps, and horn, in perfect condition throughout; £35.—The Premier Motor Co., Aston Rd., Birmingham. [8752

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TRIUMPH, 3½ h.p., 1913, 3-speed, and coachbuilt S/car. **£39**
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DOUGLAS, 2⅜ h.p., 1914, 2-speed, and accessories **£43**
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INDIAN, 7 h.p., 1914, clutch model, speedometer and horn **£45**
ZENITH, 6 h.p., 1913, kick-start, Gradua gear, speedometer **£45**
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With coach-built Sidecar **£60**
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INDIAN, 7 h.p., 1915, Model D, hand clutch, accessories **£49**
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HARLEY-DAVIDSONS.—Five genuine 1917 models in stock, electric equipment, £102; standard model, £93; Model C sidecar, £24/10; Model B, £22/10; only limited number of these machines available.—Lamb's, 151, High St., Walthamstow, and at 50, High Rd., Wood Green. [8604

1916 Harley-Davidson Model 16F, and bulbous backed latest pattern sidecar, owner driven, and carefully looked after, only used week-ends, and would almost pass for new, mileage under 3,000, smartest second-hand outfit on the road, guaranteed faultless; genuine bargain, 80 gns.—Harris, 38, Royal Av., Chelsea. [X6734

Humber.

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882

HUMBER, 1917, latest models, 3½h.p. and 6h.p. horizontal twins, actually in stock.—Moss, Wem. [X6793

1914 3½h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863

HUMBER, 1914, 3½h.p., 3-speed, Lucas lamps, done 1,000 miles; £33.—Evans, Gilfachwenissaf, Llandyssul. [X6637

3½h.p. Humber, 1913-14, latest model, improved Roc gear, lamps, etc., little used, perfect; £25.—80, Bispham Rd., Southport. [X6667

HUMBER, 3½h.p., 1913, 2-speed, clutch, handle starting, splendid condition, very easy starter, 1916 underslung sidecar; £33.—Box 741, c/o *The Motor Cycle*. [X6694

Indian.

INDIAN 2-speed Combination, re-enamelled, perfect order; £38.—Slack's Garage, Stockport. [X6259

1914 Indian, 7h.p., spring frame, with Millford wicker sidecar; £45.—12, Midland Rd., Swadlincote. [X6764

7-9h.p. Indian, 1914, Mills-Fulford coachbuilt sidecar, electric lighting equipment, speedometer; £55; Photo.—Gregory, Aldeburgh. [8660

INDIAN.—T.T. bars complete, as new, 25/-; red tank, 22/-; free engine clutch, complete, 55/-.—Mitchell, Mason's Bridge, Earlswood. [X6754

INDIAN Powerplus Model G, all accessories, splendid machine; £72; extended payments arranged.—Service Co., 292, High Holborn, London. [X6724

RED Indian, 5h.p, 3-speed twin, and Mills-Fulford sidecar to match, very fine combination; £62/10 —Motor Exchange, Horton St., Halifax. [8348

INDIAN, 5-6h.p., spring forks, mag. ignition, dropped back, guaranteed running order, less few carburetter parts; £16.—80, Bispham Rd., Southport. [X6666

INDIAN, 7h.p., 1915, in perfect order late owner killed at the Front; first cheque for 40 gns. accepted.—Motor, The Wycke, Burnham-on-Crouch. [X6603

INDIAN, 7-9h.p., practically as new; owner at Front; any examination; first offer £55, no offers; only wants seeing.—Muskett, 88, Station Rd., New Southgate, N. [8283

PETROL Free with 1913-14 spring frame 7-9h.p. Indian, 2-speed, clutch, 34 gns.; also 1915 5h.p. 3-speed Indian, T.T., 39 gns.—Troward's, 78, High St., Hampstead. [8676

1916 G Powerplus Indian, 3 speeds, used since last September, 800 miles solo, whole condition, including tyres, as new; £60, no offers.—10, St. John's Crescent, Cardiff. [X6796

1916 5h.p. T.T. Indian, and light, comfortable Phœnix sidecar, both absolutely as new, splendid condition, only wants seeing; nearest £75 secures.—R Rogers, Sturminster Newton. [X6602

INDIAN Combination, 7-9h.p., clutch model, new February, 1915, good condition, original tyres still on; £45, or near offer.—Sgt.-Major Turvey, 2-8th Dunham Light Infantry, Basingstoke. [X6704

INDIAN, 1915, 3½h.p., new condition, spring frame, original tyres, machine only run few hundred miles, fully equipped; bargain, £34; exchanges.—W. Ayers, Lower Garage, Kensington Palace, W. 'Phone: Park 86. [8725

INDIAN, 1915, 7-9h.p., road racer, magnificent order and condition throughout, specially tuned, and carefully used, runs well on substitute, Euk easy starter, speedometer, mechanical horn, lamp, etc.; £40.—Box 739, c/o *The Motor Cycle*. [X6676

INDIAN 1916 7-9h.p. Powerplus, electric lighting and horn, spring frame, finest coachbuilt sidecar, everything complete, including spare new tyres; price £95; seen by appointment.—Managing Director, Empress Picture Theatre, Upper St., Islington. [8568

INDIAN, 1914¾, 7-9h.p., spring frame, 2 speeds, clutch, kick starter, electric lamps and horn, speedometer, and Millford coachbuilt tandem sidecar (red., hood, screen, and side curtains, splendid condition; £55 —Box D703, Clarks, 58, Gt. Portland St., W. [8785

1914 Indian, 2-speed, clutch, electric head lamp, nearly new tyres, spring frame; 100 mile trial to purchaser; all accessories and spares; genuine bargain, £30. Phœnix sidecar for same, £10; will accept War Loan stock.—Read, 1, Hare St., Bethnal Green, near Bishopsgate. [8730

Ivy.

IVY-PRECISION, 4½h.p., in fine order and condition; £20.—Maxim, 31, Hamthorpe Rd., West Norwood. [0871

MOTOR CYCLES FOR SALE.

Ivy.

1913 Ivy-Precision, 3¾h.p., Bosch, just overhauled, very fast; £19.—J. Rogers, 2, York Terrace, Chertsey Rd., Byfleet, Surrey. [8618

IVY 2-stroke, 1915, overhauled, all lamps and accessories; £24; extended payments arranged.—Service Co., 292, High Holborn, London. [X6725

2½h.p. Ivy 2-stroke, December, 1915, splendid condition, 6 gallons petrol available, good lamps, etc.; honest value, £25.—A.H.C., Post Office Staff, Woking. [8645

James.

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803

JAMES, 1913, 86×96, countershaft gear, and coach sidecar; £39/10.—Motor Exchange, Horton St., Halifax. [8349

JAMES 2-strokes, 1917 models, for immediate delivery.—Colmore Depot, 211, Deansgate, Manchester. [0888

JAMES, 1912, 3½h.p., free engine, clutch, just overhauled; £20; extended payments arranged.—Service Co., 292, High Holborn, London. [X6726

JAMES 1915 Model No. 6 Combination, 4¼h.p., 3-speed, lamp, horn, speedometer; £57/10; deferred terms, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8603

JAMES, 1917 models, for immediate delivery from stock. Big "Four" combinations, with and without Lucas dynamo lighting set; 3½h.p. twin, and two-stroke models.—P. J. Evans, John Bright St., Birmingham. [8694

JAMES 1916 4¼h.p. Combination, Lucas dynamo electric lighting, electric horn, speedometer, leg shields, silencer extension, luggage grid, splendid condition, recently overhauled; £75.—Hill, Stoneleigh, 178, Queen's Rd., Wimbledon. [8731

J.A.P.

J.A.P., 4h.p. engine, tyres and finish like new, little used; bargain, £23.—J. Woodcock, Barton Field, Barton-on-Humber. [X6750

J.A.P., 1912, 4h.p., wicker sidecar, side door, 2 speeds, Bosch, Druids, B. and B., good running order; £32/10.—3, Denmark Rd., Camberwell. [8728

Kerry.

KERRY 4h.p. Twin, Bosch mag., overhauled and re-enamelled and plated; £10/10, a bargain.—Percy and Co., 337, Euston Rd., London. [8792

KERRY 3h.p. Motor Cycle, spring forks, T.T. bars, low, reliable, accumulator; first £3/15.—Captain Bates, 247, King's Rd., Kingston-on-Thames. [8580

Levis.

LEVIS, latest, brand new, single and 2-speed models in stock.—Moss, Wem. [X6794

LEVIS 2½h.p. Popular, late 1915, in first-class order; £22.—14 Dodbrooke Rd., West Norwood. [0895

LEVIS, 1915, 2¼h.p., Lucas head light, splendid order; £20.—Potts, Barnards Green, Malvern. [X6686

LEVIS.—Three 1917 Popular Models ready for immediate delivery; £32 each.—The Walsall Garage, Walsall. [X6609

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804

LEVIS, 1916, 2½h.p., mag., 2 speeds; cost £47/10, bargain, £33/10; exchanges.—Wandsworth Motor Exchange, Ebner St., Wandsworth. [8264

LEVIS 1917 Popular, latest model, just arrived from works, £32; also one slightly soiled, £29/17/6.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [8600

1916 Levis, 2¼h.p., 2 lamps, fine condition; only 20 gns.—Julians, 84, Broad St., Reading. Biggest light car and motor cycle dealers in the South. 'Phone: 1024. [X6623

1916 Levis, 2¼h.p., complete with lamps and generator, horn, and speedometer; only 24 gns.—Julians, 84, Broad St., Reading. Biggest light car and motor cycle dealers in the South. 'Phone: 1024. [X6622

Matchless

MATCHLESS Motor Cycles: no quicker delivery obtainable than from Colmore Depots. [0881

MATCHLESS-J.A.P. 6h.p. C.B. Combination, perfect, like new; £52.—Slack's Garage, Stockport. [X6258

1913 T.T. Matchless, 6h.p. J.A.P. engine, complete, lamps, etc.; £31.—Cross, Effingham Sq., Rotherham. [X6710

MATCHLESS Combination, 1915, M.A.G. engine, Gloria sidecar, hood and screen, spares, exceptionally good condition, 7,500 miles; £75.—Legge, Riding Mill-on-Tyne. [X6027

MATCHLESS 3½h.p. Twin, 1914, 3-speed, clutch, kick starter, 1916 Empire C.B. sidecar fitted, excellent condition throughout; £45; no offers.—Hampton, Roslyn, Warwick Rd., Coventry. [X6703

MATCHLESS (late 1915) M.A.G. Combination, 3 speeds, Lucas electric outfit, extra sprung reconstructed sidecar, splendid condition; £90.—Write, W. McCullagh, 41, Kirkstall Rd., Streatham Hill, S.W. [8757

TWO DRAWBACKS

exist at the present time for would-be Motor Cyclists. We have devised

TWO SCHEMES

to help our customers under the existing difficulties. Some people fear to take up Motor Cycling at the present time for two reasons.

First, the petrol question. They think that if they purchase a machine, they will not be able to run it for want of petrol. To alleviate this, we have decided to continue our policy, introduced during the petrol shortage of last year, of giving

PETROL FREE

in quantities up to 10 gallons to all who purchase a machine from us. As all our machines are tuned to run on substitute to the best of their ability, this should suffice, judiciously used, for a season's mileage.

Secondly, people fear that they may be called up, or become engaged on Munition Work, or under the National Service Scheme, and that they would then be encumbered with a useless machine. To deal with this, we are introducing our

REPURCHASE SCHEME,

which is equivalent to

HIRE AT 13/4 TO 30/- PER WEEK,

according to whether the machine is kept 1 or 6 months.

Briefly, our scheme is this:

We will sell any machine on our lists under the following written agreement:

If the machine is returned within a month from purchase, we will take it back, and refund the full amount paid, less the sum of £6 for the Hire, which works out at 30/- per week.

In two months, we will take back at £9 reduction, which works out at £1 2s. 6d. per week.

In three months, at £11 reduction, or 18/- per week.

In four months, at £13 reduction, or 16/- per week.

In five months, at £15 reduction, or 15/- per week.

In six months, at £16 reduction, or 13/4 per week.

Thus, our Customers need never fear that they will not be able to dispose of their machines at once, if called up, or if other necessity arises calling for an immediate sale.

The same rates apply, whether the machine is worth £30 or £130. The Scheme only applies to cash deals.

We are not prepared to hire machines at any terms, except under the above scheme.

Of course, if our customer can get a better price elsewhere, when he comes to sell, he is under no obligation to return the machine to us; but, if he does not do so within six months, we reserve our right not to repurchase.

Our usual guarantee applies to machines sold under this scheme.

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1914 3½h.p. Motosacoche, 2-speed, De Lissa valves, fast; £27.—Bird, 10, Amersham Vale, New Cross. [8763

MOTOSACOCHE, 2h.p., wants cleaning, battery, otherwise faultless; bargain, 4 gns.—Pearce, Garden Lea, Ulverston, Lancs. [X6767

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J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Imperial-Japs. Immediate delivery. [7862

COLMORE Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0805

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1915 New Imperial-Jap, 2½h.p., 2 speeds, lamps, horn, spares, little used; 23 gns.—Pelly, Kington, Herefordshire. [X6766

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NEW Imperial 1917 Models for immediate delivery; model 1, 39 gns., No. 2 46 gns.; several second-hand 1916 machines from £30.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0886

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O.K.

O.K. Junior, 2¼h.p., new May, 1916, very little used, equal to new; £25.—Box 747, c/o *The Motor Cycle*. [X6806

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P. and M.

1913 P. and M., 2-speed, condition good; a bargain, £26.—Ross, 86, High Rd., Lee. [8654

1912 P. and M. Coach Combination, 2-speed, speedometer, P. and H. lamps, new condition; £33.—47, Honeybrook Rd., Balham. [8760

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The Flywheel Magneto.

THE British magneto industry has already expanded to such an extent that it is a foregone conclusion that after the war the whole of the requirements of motor manufacturers will be satisfied by home products. Thus for the first time the motor industry of this country will be self-supporting—a condition of affairs we have for years striven to attain. With the characteristic tardiness of Britishers to rally themselves, the support of our agitation was at first by no means whole-hearted, and the position for a long time remained indefinite. Now, however, numerous works are established and the weekly output of magnetos is at the present moment very considerable—sufficient to satisfy all peace-time demands. It was, in fact, stated officially the other day that 165,000 magnetos had been produced in British factories since the commencement of the war. At the present moment the factories are, of course, engaged upon Government work, and, in passing, one wonders what we could have done in the matter of magnetos for internal combustion engines had the erection and equipment of works been delayed when war broke out. Now the magneto which is being produced for motor cycles largely follows standard pattern, and some makers have come to regard that instrument as finality. It would be a pity for all to assume that improvements are not possible, for interesting developments are quite conceivable. Indeed, we have long since regarded the type of magneto fitted to the two-stroke motor cycle as not thoroughly in keeping with the simplicity of this type of mount. Already we have a motor cycle entirely devoid of any gearing between the engine and magneto, and instead a neat little magneto machine incorporated within the outside flywheel. By this arrangement not only is the manufacturing cost of the magneto itself considerably reduced, but the need for driving gear is completely avoided. We notice other patents recently published bearing upon this same development, and it is not unlikely that the flywheel magneto may ere long attain prominence in the motor cycle world, particularly in the lightweight field. It is well therefore to throw out a timely hint to magneto manufacturers that it may not be sufficient to produce a magneto machine on orthodox lines. The design of magnetos will progress just as the design of motor cycles and their other appurtenances progress, and it behoves the designers employed by firms engaged in this electrical branch of the industry to be alive to the point.

Concessions to Service Men.

TWO minor items dealt with in this issue which affect numerous readers are (1) the question of keeping in condition the motor cycles of friends at present in the Services, and (2) the necessity of such Service men taking out (1) a local taxation licence and (2) a driving licence for a single run which they may enjoy during a brief leave.

The first question is one quite easy of settlement. The other, we are afraid, entails a long and strong pull to obtain a Government concession. We use the term "concession" advisedly, though, as a matter of fact, in many cases the men in question took out a licence for twelve months and joined up long before the expiration of that time, so that in effect they have several months of ownership due to them. The same remarks apply to driving licences which every driver of a motor cycle or motor car must possess.

Our sole anxiety is for the interests of riders who are doing their part in the country's cause, and who, during a few precious days' leave, would enjoy nothing more than a spin on a motor cycle to bring back old memories and delights. It is not a complicated matter to adjust these minor points in a manner which would enable any member of His Majesty's Forces to enjoy a trip on the open road, and we hope something may be done.

An index to the advertisements in this issue will be found on the page facing the back cover.

DUG-OUT DEBATES

THE war and the new army with all its varied motor sections have undoubtedly caused numbers of men to become enthusiastic over, or interested in, motor cycles—men who previously took no interest whatever in such things. Judging by the number of queries, usually of the hackneyed type, that emanate from dug-outs "somewhere in France," or from other fronts, it is evident that motor cycle discussions are a pretty regular occurrence in "off" moments, even among men who are not in any way connected with the motor sections. Apparently the motor cycle and its problems make pleasant topics and discussions to pass the time during these long winter nights in the trenches. The queries we receive are remarkably diverse, but, curiously enough, the majority from the trenches revive very, very old controversies. Some have been answered and discussed time and again in these columns. We are going to forestall any more queries of the same kind, and have collected with that object a few of those which most regularly recur. Perhaps our comments will bring enlightenment to some of our comparatively new readers.

Which Wheel Lifts?

A rare old chestnut which crops up as regularly as clockwork—a very curious fact, considering the apparent obviousness of the answer. The form in which the question is most commonly put is, "Which direction does a sidecar outfit have to be turned in order to cause the wheel of the sidecar to lift?" The answer is, of course, a turn to the left, if the sidecar is fitted to the left side; or right, if the sidecar happens to be on the right-hand side. It is a law of nature that any body, if once set in motion, continues to travel in a straight line; therefore, if some force tends to alter the direction of travel, the natural tendency of the body is to resist that force, and thus the body tries to slide or skid—back to the original direction. In the case of a motor vehicle, however, the wheels grip the ground sufficiently to prevent the skidding tendency, but the fact that the vehicle tries to continue in a straight line causes the wheels on the inside of the curve to lift.

Why does an Engine Knock?

This query is rather more permissible, as apart from the knocking which sometimes occurs in absolutely new engines, and is in consequence somewhat difficult to account for, there are quite a number of somewhat obvious reasons which may explain this unpleasant but familiar sound. In some cases it is easy enough to explain the exact cause of the noise; but in others, although it is easy enough to say how the noise can be cured, it would be difficult, if not next to impossible, to state definitely and exactly what is taking place inside the engine. The following conditions will often account for knocking. The two commonest conditions which will cause any machine, irrespective of its general condition, to knock, are too much air and the ignition too far advanced. Other reasons are *worn bearings*, most commonly the big end of the connecting rod, though any of the other bearings being worn may cause knocking. *Excessive carbon deposit, unsuitable plug electrodes*, or *too high compression* will cause pre-ignition and overheating, with knocking as a consequence. Under-lubrication may also cause most serious knocking; while piston rings which are a loose fit in their grooves cause a very elusive tapping, similar to that of a worn tappet gear or loose bearing. The metallic knock which sometimes occurs in an absolutely new engine can be put down to many causes, but up to the present no one has really definitely proved what it is.

"The road conditions in France are truly terrible," says Pte. A. Greenhalgh, A.S.C., M.T., "but we carry on cheerfully. The marvel is the motor cycles standing the ordeal, but they do, for mine is running as well to-day as when I had it new." Greenhalgh is attached to the Anzacs as a despatch rider.

The Front Wheels of a Car.

Another old chestnut is the argument as to whether the front wheels of an ordinary motor car are pushed or trailed. "Of course they are pushed," ejaculates the normal person, but the wily one of the party prefers to think otherwise. He argues that the springs do the work, and since the forward end of the springs only are permanently connected to the frame, the axle and its wheels must be trailed. When the argument becomes fierce—they write to *The Motor Cycle* to settle it. Our ruling is that both parties are right: and in any case does it matter *very* much?

The Fastest Speed.

Another question which seems to be interesting men in the trenches is the speed attained by various motor cycles. Such queries as "What is the highest speed ever attained by a motor cycle?" or "What is the highest speed ever made by a motor cycle in England?" and again, "Who holds the 500 c.c. single-cylinder hour record?" occur almost daily.

The highest speed ever recorded is 103 m.p.h., which was attained by Jack Booth on the Gawler Road, in Australia, over a distance of one mile, on an eight-valve twin Indian.

The highest speed yet attained in England is 93.48 m.p.h., by S. George, also on an eight-valve Indian, at Brooklands, over a distance of one kilometre.

The 500 c.c. single-cylinder hour record was last made by G. E. Stanley on a 3½ h.p. Singer on October 15th, 1912, when he covered 67 miles 782 yards in the hour.

The Hour Record.

The hour motor cycle record is held by A. J. Moorhouse, who, riding a 7 h.p. twin Indian, covered 70 miles 1,388 yards in the hour at Brooklands on November 21st, 1911. Moorhouse, it will be remembered, was killed at Brooklands during a B.M.C.R.C. one hour race on April 20th, 1912. At the time of the accident he was riding inside his own record time.

Ford jokes also are evidently popular in the dug-outs, for we receive numbers of these, supposed to be new and original, which we heard years ago.

Nothing Loose in Twelve Months.

THERE are two spring-framed machines in my garage, one of which has done over twelve months of hard work, the other about nine months. On the first machine not a single part has ever shaken loose in about 9,000 miles of rather fast work; no nut or screw has ever been found in need of tightening. On the second machine two or three details have worked loose at various times, but they have all been parts which depended on the front fork for insulation from road shocks, namely, the hooter, the front mudguard, and so forth; though machine No. 2 is inferior to No. 1 on this score, it is nevertheless infinitely superior to the average rigid-framed machine. In neither case have I on any single occasion overhauled the nuts as a precaution; they have simply kept tight throughout the whole season without any attention whatsoever; and I am sure no rider of a rigid rear frame can claim to have done a season's hard work without finding a nut slack. This implies that the advice given in motor cycling handbooks—to go carefully over all the nuts once a week or so—is becoming obsolete, and that the twiddly bits of motor cycles should shortly become as vibration-proof as those on a good car.

A Sturdy Midget.

A COUNTRY agent asks what has happened to the $2\frac{3}{4}$ h.p. overhead valve J.A.P. engine which used to do its 60 m.p.h. ten years ago in the hands of men like the Colliers and Harry Martin? He points out that the modern baby engine cannot approach this performance, and wonders why similar engines are no longer exploited. I suppose the simple fact is that ten years ago some judges fancied that the 350 c.c. engine would satisfy the demand for solo work, and so manufacturers spent money on exploiting such types. It gradually became clear that the sidecar and fast hill work interests wanted a little more power, and so the trade turned its attention to larger sizes. The market for "baby" engines to-day is a market which is not interested in speed. The Douglas is almost the only 350 c.c. engine which has been habitually exploited on the track, and it stood for some years in a separate class, as it was produced as a direct rival to the $3\frac{1}{2}$ h.p. on its own ground, even though sidecar interests have since compelled its makers to offer a 4 h.p. Nobody dare prophesy what the next Junior T.T. will bring forth; in the past this event has been something of a feeler, both technically and commercially. The public have not decided what kind of lightweight they really want; the trade have not discovered an ideal specification, and engineers are still coquetting with the two-stroke, the small flat twin, the medium flat twin, the small single cylinder, and the miniature V twin. If I had to hazard a guess, it would be that the near future of the lightweight rests with the two-stroke and the flat twin.

Smashed Gears.

I AM a little disquieted by the numerous cases of smashed motor cycle gear boxes which have come to my knowledge during the past year or so. Wherever I have been able to investigate the facts of a particular case, the makers have proved to be blameless; and the damage has invariably been due to some stupid piece of mishandling by a clumsy driver. The cause does not affect the fact that frequent gear box troubles are very bad for the sport. It is often impossible to convince the user that he can blame nobody but himself, and his grumbles will not serve to popularise the machine he rides, whilst his troubles will be common knowledge in his district, and will create a public impression that motor cycles are expensive and unreliable, whereas the simple truth is that the modern gear box is very far from being foolproof. One is almost inclined to suggest that the plan of interconnecting the clutch and the gear lever, as adopted by a few American makers, may be worth consideration. At any rate, the bulk of these injuries are due either to the driver altogether omitting to declutch for a gear change, or to his failing to synchronise his clutch and gear work. Cases of this very elementary blunder have put crack riders out of the T.T. before now—they have confessed as much to me in confidence; and, if experts can be guilty of such aberrations in moments of excitement, it is obvious that a nervous and excited novice is hardly to be trusted with a light and fragile gear box. In some cases imperfect design of the gear control may be partially answerable. On a good car the gear lever can be trusted to slide smoothly into any of its five or six positions under finger pressure. On a motor cycle the driver has to steer and balance with one hand whilst he is changing gear, and his left hand is very possibly doubly employed with a clutch lever as well—if not, his foot is busy with a pedal. The chances of a blunder are considerably enhanced if the "gate" is very narrow and full of corners, or if the springiness of the control necessitates some force to coax the lever into the highest and lowest notches, or, again, if the design makes it easy for the lever to slip past the intended notch. Whatever solution is adopted, all these details require the closest attention from some of our manufacturers, especially as novices take out these machines—which are more difficult to drive than a car—after very superficial instruction indeed, and with no mentor aboard to supervise and criticise their early efforts. More attention should be paid to driving lessons, now that our machines are more complex and more liable to injury when mishandled.

More Sporting Reminiscences

By Veteran

FIFTH INSTALMENT. (Previous Articles appeared in our issues of April 13th, June 15th, Sept. 14th, and Dec. 21st, 1916.)

I ALWAYS fancied that reminiscences ceased to charm till one reached the Darby and Joan era, and spent one's evenings by the fireside with a gouty leg cocked on a hassock, and a basin of gruel somewhere adjacent; but the Editor says my memories of bygone days go down well with the temporarily off-saddled boys in France, and he commands me to ransack my brain pigeon-holes for another instalment. Like the famous French preacher, I can preach to any text to order, provided it be motor cycling and not Scripture; what will ye have, gentry? Tyres? Troubles? Or assorted? This week I think it had better be a random lot.

A Trial of Six Days' Duration.

There is a vein of altruism in my nature, which has more than once betrayed me into helping lame dogs over stiles. It may be sound enough in financial matters, when a coin or a cheque ends the business, but it is the deuce and all when it sets you to assist a struggling friend in the motor industry by buying and riding the bad machines which he is trying in vain to sell. My first real piece of unselfishness occurred in connection with an impecunious friend, who thought he had invented a brilliant motor bicycle, but who lacked the money to push it. I intended to spend part of my annual holiday on a six days trial, and, half believing in his boasts about his new engine, I bought a sample and entered it. The machine was reckoned as 2¾ h.p. in those days, and possibly developed that figure on the bench when new. It ran beautifully the first day from a mechanical standpoint, and I looked forward to a very pleasant week. The one fly in the ointment assumed the form of tyre troubles. The covers were apparently tissue paper; they punctured whenever we passed an ironmonger's, and burst if they smelt a broken bottle in the hedge. I took maximum time over most controls, and finished the day's run about 10 p.m. Tyre troubles could be repaired overnight under the rules then in force, and I sat up into the small hours fitting two new covers by candle-light in an odorous stable; I should have got to bed earlier if the official observer had not been a merry soul. As it was, he refused to superintend my labours until the last of the boys had gone to bed.

More Tyre Troubles.

So it was nearly breakfast time before I got to roost, and the shaving water arrived in the middle of my first beauty sleep. The new tyres were the same brand as the others, and bursts and punctures occurred next morning as regularly as the tack-tack of a machine gun on a sweeping traverse. Moreover, my untrustworthy friend was evidently a rotten metallurgist, for it became clear in the course of the second day that the piston rings had worn down flush with the piston, and eke that the exhaust valve was scaling off its face in great chunks. At first I supposed that the valve was the sole culprit, and though it had a 40 lb. spring and the kit contained no remover tool, I fitted a spare, only to discover that the missing compression would not return, and that the rings were the real offenders. By midday there was about as much compression left as a feather can produce in a briar pipe. I was doing l.p.a. on every grade exceeding 1 in 80, and there was plenty of 1 in 8 ahead along the road. Being a man of brawn in those days I kept going until the Friday, putting on at least one new cover daily, and excoriating my knuckles swopping exhaust valves with a screw-driver as my main tool. On Friday evening the

More Sporting Reminiscences.—

machine began to go crabwise on a bone dry road, and I discovered that the front down tube of the frame was only attached to the steering head by a precarious flake of varnish. I trained home in a pet, and slept for a week.

By next summer my friend claimed that his engine was perfect, and I bought another sample for that year's six days, only stipulating that he should fit a two-speed gear, as my calves ached at past memories. Not having had time to design a gear of his own, he fitted a proprietary chain-driven gear.

I picked up the machine at Penzance, and liked the look of it; very few entrants had variable gears, and I promised myself some scores off ancient foes.

How I Won a Gold Medal.

The first day's run to Taunton was something of a terror at that era, and my machine wouldn't do more than 24 m.p.h. all out. I hadn't a notion what was the matter with it, and the single-geared men nearly fell off their saddles with glee as they saw me toiling up the long Cornish and Devon rises at about 6 m.p.h. on bottom gear. This humiliating weakness continued all Monday and part of Tuesday; but I kept going in the Micawberlike notion that something might turn up, or a brain wave occur, and schedules then allowed us 16 m.p.h. maximum time. By dint of taking all downhill bits on full throttle I kept inside this figure. When we reached Gloucester on the Tuesday I decided that bad oil must be my trouble. I drained my tank, put in two new valves, and filled up with genuine sealed Price's. Hey presto! I could do 45 m.p.h. anywhere. I kept busy wiping the eye of my single-geared pals till we got well up in the Highlands, where we struck a Scottish mist, and real slime. The chain drive had buckled my light frame, and the side-slips were marvellous to behold. It wasn't a question of slide, tug, wobble, and recover. It was just wop—and heavy sideways impact with the 'ard, 'igh road—like being charged by a 14-stone soccer back when one is on one leg. Entering Inverness I almost sat down and cried. Better men than I on true frames were tumbling off in every direction, and my machine simply would not stand up. I had a rare punishment. Further north things improved, and thanks to my gear I made one of the very few clean ascents of Berriedale, amid much cheering. After that the chain drive bent my crank pin; my valve lifter broke; and various other misfortunes overtook me. However, I struggled into John-o'-Groat's in this wise. My overalls were torn to ribbons. My lamp bracket had gone phut in a side-slip, but as almost the only "condition" rule compelled us to finish "with lamps," my lamp hung round my neck with picture cord. My gearshaff had developed a habit of jumping out of mesh, so my right hand carried a huge spanner with which I clumped the shaft whenever it jerked free. Between my teeth was a penny attached to the handle-bars with string for holding the valve open to get starts with. My crank pin being bent, the engine was developing about one sardine power, and I was driving noisily on the low gear in clouds of smoke. But I was up to time, and got my duly advertised gold medal sure enough! The machine could never have got back to Wick, and I left it to be carted to railhead by a Groat's gillie.

Another Lucky "Gold."

An even more remarkable "gold medal" was won in that same trial by a whilom famous passenger machine, which spun back to Wick just ahead of the car which carried me. About halfway back, say ten miles from the finish, we saw the tops of its rear tyres gracefully incline inwards, as its back axle collapsed. Needless to say, this interesting detail did not appear in the subsequent advertisements.

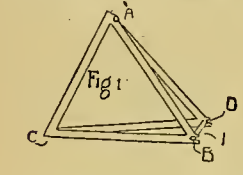
Adventures in a Tricar.

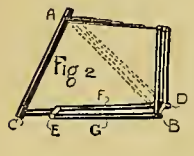
Not long after came the epoch of projectile tricars, and, needless to say, I soon found myself afflicted with one of the worst. It was a beauty to look at. I then resided in a London suburb, and I can still remember the crowd that assembled when we uncrated it—shining nickel, red leather, Napier green panels, with white and black stripes. In motion it was less admirable; for example, nothing would induce it to cross greasy tramlines on the straight. On its maiden run it had five or six essays to cross a tramline junction somewhere near Brixton, and shied right round every time. Finally, I learnt that the dodge was to go very fast, and aim its nose at three o'clock; it would skid round to nine o'clock, and the pace would swish it across in mid-skid. To see what the machine would do, I decided to start from London for Coventry at 4 a.m. on a summer day, and put up a phenomenal average speed, of which its 15 h.p. engine was undoubtedly capable. My driving of that projectile through the northern suburbs what time milkmen and Covent Garden vans are astir was lurid to a degree, and by the time we got clear of town there were no surviving brakes. Then it began to rain. I was doing a cool fifty up a gentle curved slope somewhere in the Bletchley district when an enormous skid occurred, and I found myself tearing along on the top of a turf bank some three feet above the road. I had barely realised this before the machine rammed its nose deep into a heap of manure; the wheel took me in the tenderest portion of the anatomy with a hideous "wop," and I remembered no more. When I came to I staggered towards a solitary house, and was immediately assaulted by whole battalions of dogs; however, the keeper of the dogs' home was a good Samaritan, and before very long a car came out from Towcester to tow me in. The tower forgot I had no brakes, and downhill I invariably began to ram him. At the last moment he would hear my shrieks and accelerate; having no non-skids he would then begin to side-slip. Side-slips are always thrilling, but for real fear put me in a towed car attached by a 10ft. rope to a big car which is out of control. We got the projectile repaired, and late that night I restarted for Coventry. The manure heap had binged my silencer off, and near Daventry I had to stop the engine, as some racehorses objected to it in the dark. My lamps gave out before I discovered anything amiss, and then it would not start; with my last match I discovered that a nut had dropped off the air control, and that the satisfactory resistance of a lever on the quadrant did not prove there was anything doing at the carburetter end. I slept at Daventry, and next day my accumulator ran down four miles out of Coventry. I staggered into the works more dead than alive, having taken exactly thirty-six hours on the projected record of ninety-seven miles.

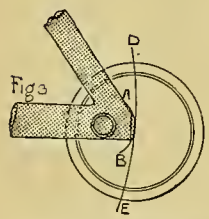
Rear Springing of Motor Cycles

A Doubly Eccentric Hub which Preserves the Correct Distance between the Driving Centres.

OF the many problems which motor cycle manufacturers must tackle in earnest after the war the subject of rear springing stands out prominently, for one thing is certain, viz., that the trend of motor cycling is towards increased comfort, and the rigid back frame will soon become as rare as rigid front forks are at present. A great number of designs have been evolved, many good as far as solo work is concerned, but in other cases there is a tendency towards the same weakness, *i.e.*, lateral stiffness.







(1) A triangulated rear frame. (2) Spring frame of common design lacking in lateral rigidity. (3) Eccentric hub.

The common difficulty lies in producing a form of design which combines the merits of the rigid frame and still allows a vertical action of the wheels, which I would suggest can be done in a perfectly valid and mechanical way.

The vital point is the amount of up and down movement you must give to the wheels in order that road shocks be eliminated, and this is where most designers differ. For my part I think a 2in. movement is sufficient, and I base my opinion on the following facts. The amount of movement or yield between an iron-tyred lorry and one shod with solid rubbers can be measured in eighths of an inch, yet the gain in comfort is enormous, while the difference in yield between a well-inflated pneumatic and a solid rubber tyre does not exceed one and a half inches, if as much, so it will be seen that, taking everything into consideration, two inches of vertical movement will give almost complete freedom from road shocks.

The Sidecar Question.

Having settled this point, the next is to consider whether your spring frame is to be strong enough to take a sidecar, and to this question the great majority of riders must say "yes." After all, solo riding is only for the few; the greatest number want a machine which can take a sidecar. Now the strains and stresses set up in a sidecar machine are much greater and more complex than the strains in a solo machine, and a spring rear frame which might do very well in a solo would soon wear itself to pieces in a combination. Therefore, if rear springing is to become universal, it will have to be at least as strong laterally as the back triangles of a rigid frame.

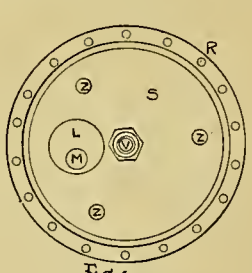
Twisted Frames.

Fig. 1 shows the system of triangles on which the rear frame is constructed, and fig. 2 shows what is practically the only type of spring frame at present on the market, and how the strength of triangle ABD is altogether lost, while that of DCB is weakened by the hinge E. Now it is the triangle ABD which gives the rear portion of the cycle frame its lateral rigidity and strength, and when it is taken away the whole remaining structure becomes unstable. To counteract this to some extent the legs F and G are made of heavier tubing, but this does not help much. Sooner or later these legs will get a twist or "set," and then the drive is out of truth. The twist comes from many sources—a sudden swerve, the wheel striking a deep rut or kerb will do it, whereas a rigid frame would be strong enough to overcome the sudden strain. By lengthening the hinge E and the axle I greater strength is obtained, but at the best the ability of legs F and G to stand twisting strains is not great, and I doubt whether this type of rear springing will long survive.

Some designers leave the triangle ABD intact, but miss out the through axle I, which is really the keystone to the whole structure.

The Eccentric Hub.

Now it will be seen that the problem is to keep the four triangles ABD, ACB, ACD, and DCB intact, and still give the wheel a vertical movement. This can be done in only one way, that is by mounting the hub eccentrically to the axle, as shown in fig. 3, but it has the great disadvantage of constantly altering the tension of the drive, which makes its use impossible. The hub rotates through arc AB, while the radius of the drive is represented by arc DE.



Plan and sectional views of the doubly eccentric hub.

Rear Springing of Motor Cycles.—

At the same time, I have always regarded the eccentric hub as offering the best solution to the problem, and after experimenting with it for some time I designed a hub which has its advantages and without

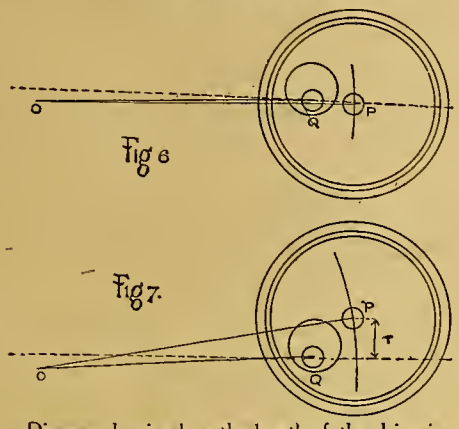


Diagram showing how the length of the drive is unaffected by the rise and fall of the axle in the doubly eccentric hub.

its disadvantage, for it can rotate through practically any radius, under control of a distance or radius rod. This hub is shown in figs. 4 and 5, and its chief feature is that, instead of the axle M passing directly through the side plates S, as it does in fig. 3, it passes through a floating eccentric L. This eccentric L allows the whole hub to rock slightly forwards and backwards on its axle M. This is shown in figs. 6 and 7. The distance OP represents the radius rod, while OQ is the length of the back horizontal stay or fork into which the axle M is secured. It will be noticed that the hub has moved vertically the distance of T, yet the distance between O and P has not varied in the slightest, so that the tension of the drive, be it chain or belt, remains unaltered. The hub consists of five elements, the shell R, the side plates S and U, with their ball bearings, the floating eccentric L and the centre piece V; steadying pins Z can be added if necessary.

Two great advantages are obtained by this design in preference to hinging the frame; first all the advantages of the rigid frame are retained, and secondly the same type of hubs can be utilised in springing the front forks and also for the sidecar wheel. Thus they are all interchangeable, and having the same amount of movement the motion of the whole combination is in harmony.

The Complete Machine.

Fig. 8 gives a good idea how a motor cycle with front and rear springing on the lines suggested looks. The back carrier is utilised to connect the leaf springs to the eccentric hub, while the front springing is somewhat after the "Osborne" and "Indian" designs. Although both the wheels have two inches of vertical movement, the whole frame is as stiff laterally as though they were built into a rigid frame. The need for front hinged forks is also removed, which makes for strength. The radius rods keep the hub always equidistant from the gear box, and they are continued upwards until they meet the legs of the carrier.

The hub is simple to make, and the time taken to remove the front or back wheel from the frame need be little more than the time taken to remove either from a T.T. machine. With an all-enclosed

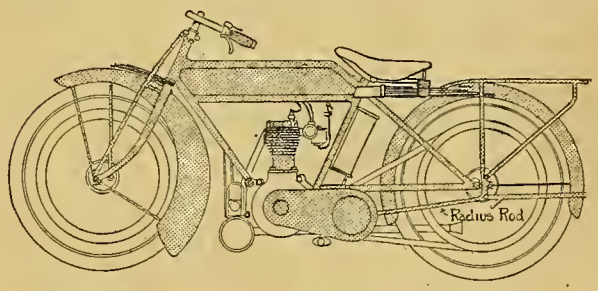


Fig. 8.—General view of machine fitted front and rear with doubly eccentric hubs.

chain drive it would be a bit more complicated, but so would any spring frame of the hinged type, and it has this point in its favour: it does not require the chain case to move with the wheel, so rattling of the case or the chains would become a thing of the past.

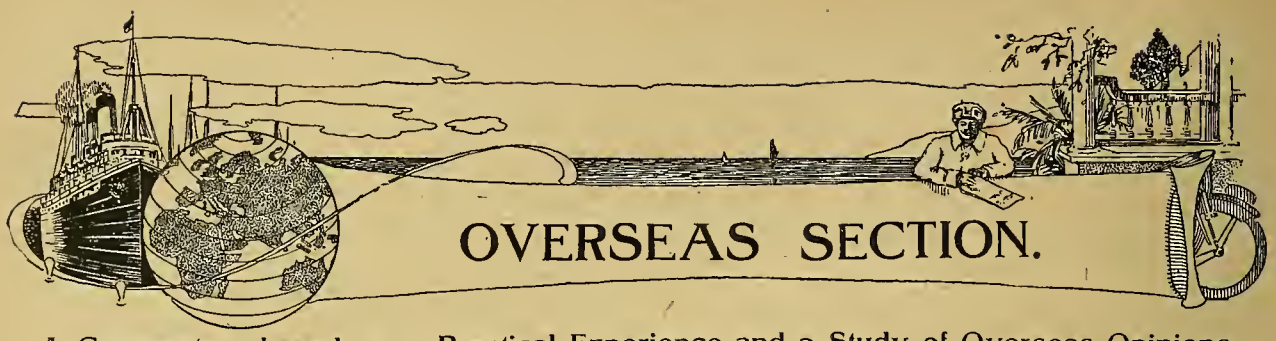
JAMES MARTIN.

NEW REGISTRATION ACT.

Some Advantages as Applied to the Motor Cycle Trade.

THE Registration of Business Names Act was passed the latter part of December. It is an Act which affects every trade in the kingdom, and none more than the motor cycling industry. It is a surprising fact how little interest the passing of this measure has caused, and yet no statute with such far-reaching results has been passed for many years. The two main objects of the Act are: (1) To prevent fraudulent trading. (2) To eliminate enemy control of business establishments. To secure these objects it has been made compulsory for a trader, who trades in a name not his own, to register the trading style and the name of the proprietor with the registrar of the district in which he trades. In the case of a partnership firm so trading, then all the names of the partners must be registered. The registers will be open to the public for inspection, and, not only so, it will be necessary for the notepaper, etc., used in the business to contain the true names of the partners.

This Act will come as a real boon to motor cyclists. After March next a motor cyclist, whether he is buying a machine or merely calling at a wayside garage for a tin of petrol, will know exactly with whom he is dealing. It will be no longer possible for a man to hide his identity under the old style of "Garage." It is an enactment which will help very considerably to breed confidence between the trade and the public, and this particularly applies to the second-hand market, where confidence unfortunately has on many occasions been severely shaken through certain dishonest practices which have been encouraged by the system of trading which will soon have to cease.



OVERSEAS SECTION.

A Commentary based upon Practical Experience and a Study of Overseas Opinions.

SINCE the publication of our last Overseas issue we have experienced in the British Isles a spell of weather almost Arctic in its severity—a period a unrelenting snow and frost, which has helped the practical rider to realise what our readers in certain parts of the world have to contend with during the winter months. Throughout this spell we used our machines continuously, though chiefly for short business trips, and for running to and from the office, and the exceptional weather conditions brought home one or two points which were not, perhaps, very fully realised hitherto.

The first of these was the exceedingly heavy nature of war time petrol. Even the baby two-stroke refused to push off on the glassy surface after a night amidst the icicles till the old familiar remedy of a kettle of boiling water, poured over the induction pipe, had been resorted to, a dodge which saved endless breath and exertion. We found also that carbide generators were not much good unless placed in such a position as to obtain the benefit of the heat from the cylinders—and even then it was, of course, necessary to thaw out before starting. On the whole, we envied a companion with an electric installation, the armoured accumulator stowed away in a sheltered nook of the frame proving thoroughly adequate for the light solo mount this man rode.

LUBRICATION AND ITS ADMINISTRATION.

COMPARED with the perplexing matter of lubrication, these, however, were minor points. One of the machines we rode during the cold snap was a small two-stroke, dependent upon sump feed and a mechanical arrangement whereby crank case suction brings the oil through. Hitherto we have regarded the oiling system of this little machine as all that could be desired, but with the coming of the relentless frost the fun started. We found that on short journeys the engine got no oil at all unless the feed valve were opened fully, then, immediately the crank case became warmed up (which it did quickly owing to an efficient hot air intake), the engine would flood with oil ere one had time to wake up and reset the adjustment. If, therefore, the oiling was set for short journeys, it was quite wrong for journeys of any length, and *vice versâ*, with the result that the system, indisputably excellent for normal conditions, would have been much improved had it been possible to make the adjustments without dismounting, the present regulation being by a grimy screw situated amidst the most grimy portion of the whole engine.

WEAKNESSES OF A MECHANICAL SYSTEM SHOW UP.

THE other machine, a small twin, was fitted with a mechanical oil pump, having external connections and an oil tank some distance from the cylinders. The system hitherto has proved infinitely superior to anything in the way of hand pumps or automatic feeds, but during the cold snap those long thin external connections, conveying oil from a tank of almost solid lubricant and forcing it to flow along their almost microscopic bore exposed to a freezing draught, were a source of endless trouble. Indeed, the oil flowed when it took the mood and stopped unexpectedly, leaving one in a state of perspiring uncertainty as to the level of the supply inside the crank case.

Mechanical lubrication is undoubtedly desirable, but, as we have urged before in these columns, the pump connections should be enclosed in the crank case and as short as possible, otherwise the flow of oil is readily affected by the atmospheric temperature.

A SPRING FRAME "SUBSTITUTE."

THERE is a lot of talk of substitutes just now. How does the idea of spring suspended seat-pillars, dealt with in our issue of February 8th, appeal to Overseas riders as an intermediary in the direction of the spring frame? A possible half measure, perhaps; but most of us are not out for half-measures. Still, we must bear in mind that even in its ultimate and finally developed stage the spring frame will probably fall short of our ideals. It may effectively insulate the rider, it may even be designed to retain positively the vertical accuracy of the back wheel, but it will inevitably add complications, and increase the number of wearing parts.

The problem is indeed a knotty one. The amateur genius is constantly bringing before us the absolute simplicity of the matter; but the spring frame, ere it can be adopted with any degree of success, must possess many properties which do not immediately meet the eye. The road to its final establishment can only be paved over the remains of thousands of scrapped models, and it must not be anticipated as the immediate result of the great effort which will be made immediately after the war. The spring frame must possess *wearing qualities*, rigidity, and lightness ere the majority of British manufacturers will be content to accept it as their ultimate design; and, because these things may take a little time to develop, we advocate the spring suspended saddle as a serviceable makeshift.

A Selection of Letters from Readers scattered all over the World.

Colonial Riders and American Machines.

"SPRING FRAME," Rockhampton, Queensland: "As a Colonial reader of your paper I have, of late, been interested at the amount of criticism aimed at Colonial riders and at Yankee machines.

"In your issue of August 10th, 1916, a correspondent writes: 'Possibly our makers are content to let their wares speak for themselves,' etc. That is all right; I know the British engines are really excellent, but I know also that the British manufacturer is building his frames neither to suit Colonial conditions nor to meet the Amercian rivalry.

"I hope Mr. P. C. Kerslake-Smith is not throwing insults at us Colonials in saying 'the American manufacturer is to be congratulated in making an almost foolproof machine,' and later on in saying something to the effect that the English maker caters for the intelligent rider. Does Mr. Kerslake-Smith mean to infer that intelligent riders are to be found only in England?

"My real object in writing was to say that the American maker is rapidly over-running the Australian market—and rightly so. Every day sees another Yank on the road, while the English salesman sits down and talks about 'British and Best,' 'Being Patriotic,' and so on.

"The English manufacturer is fast losing Australian trade, and he will continue to lose it so long as he turns a deaf ear to the wants of Overseas riders. Both the Yank and his agent will 'get rich quick'—simply because they offer us a machine suitable for local conditions."

An Old Machine in the Tropics.

MR. C. B. G. BARTELS, Penang, Straits Settlements: "I take the liberty to pen you a few lines—a stranger to you, though your paper is not to me, as I have been reading it for some considerable time. I have often wanted to write you, but have been so shy. During April, 1915, I was presented with a 1911 fixed engine Triumph, 3½ h.p., which had not been used for some considerable time. I am given to understand that it had passed through five or six hands, though none of its previous owners would take the trouble to run it. Being a Triumph, and knowing the machine—at least the make, which in my humble estimation is *Nulli secundus*—I jumped for joy, and had it placed on a handcart and brought home by my orderly. The rust was simply awful! I got a native local cycle repairer to take the machine to pieces and do it up. Every part had to be taken adrift practically with the help of a blow-lamp, but I had the machine in good running order within ten days. In another ten days I had attached a sidecar and had driven my wife and two children round Penang. I had, of course, to push and run with the cycle at intervals.

"I have since purchased a 1914 4 h.p. Triumph engine, and fixed it into the frame in place of the original. It has proved a great success, but, unfortunately, it also is a fixed gear.

"Everyone laughed when I fixed a sidecar to my 1911 3½ h.p., but soon others began to have sidecars fixed to similar machines.

"I have fitted a 4ft. exhaust pipe, which silences the engine considerably. Also I have repainted the machine, and added my initials to the tank. People wonder what make 'C.B.G.B.' stands for, and when I tell them the machine is a Triumph, they look at me with considerable doubt."

Two Sparks in One Cylinder.

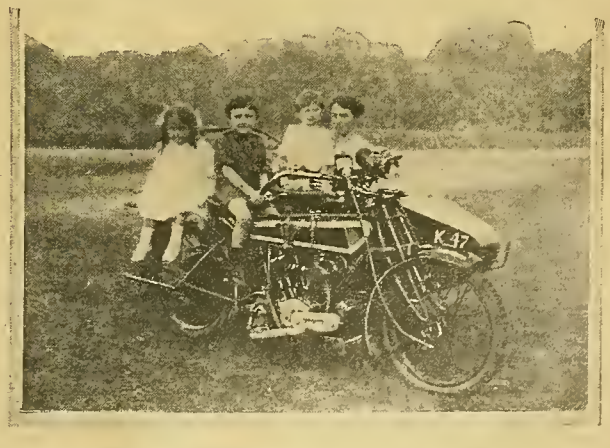
"L.W.J.D.," Nayasaland: "The usual answer that the electric current takes the easiest way is as correct as of a current of water. But we often do not know which is the easiest way for the currents, and sometimes high-tension currents take several ways, dividing themselves.

"Who has not had part of his electricity leak away, and yet got a spark, though a feebler one than he ought to have got had there been no leakage? Also when after a hundred miles riding the rider out of curiosity removes his three or four-pole plug, does he not find on all, or nearly all, poles signs of fresh sparking? He certainly will if before the riding he adjusted the poles at as even distances as possible. And if now he places the plug on the cylinder and pedals violently, will he not see two or more sparks take place simultaneously from different poles? Who doubts this should just try it. Then the man who wishes to fit two plugs in one cylinder might adjust two single pole plugs of best make a little under .5 mm., connect the two plugs by a wire, rest them on the engine, pedal hard, and as likely as not he will see both plugs spark. If he does not he might revise the distances of the points and make them .3 mm., and pedal again. He is almost sure to see both spark then. If he does not, then he need only place both in his cylinder and ride fast for, say, fifty miles, then remove the plugs, and he will see the signs of sparking on both plugs, provided both plugs were really good, and the points evenly spaced and not wider than .3 mm. Should his machine misfire with such close setting he can try the experiment with .4 mm. gaps. The starting will be a little hard, and he may have to retard the spark later on. Whoever wishes to put two plugs in one cylinder may try this for himself."

More Indian Impressions.

A reader from India says: "When first I came out to India three years ago I had a distinct prejudice against anything but British machines, and I know several other motor cyclists out here who were also of the same opinion—in fact, we used to 'slang' American-made motor bicycles; but we have all eaten our words, and are riding 7 h.p. Indians.

"I now understand that the Douglas Co. are making a more powerful machine for sidecar work, and are incorporating mechanical oiling and a chain drive in it. I hope they are putting a good clutch and plates in with the clutch pedal on the left side and brake pedal on the right (like cars). They should also braze lugs for sidecar attachments on to the cycle frame. Even if not used these would not eat anything, and would always be there if required. A point that all manufacturers should attend to is the method of fastening the handle-bars. I know of several cases in which these have become loose, half turning round, and causing the rider a nasty spill. Could not the stem and steering column have grooves cut in and a 'feather' inserted, so that it would be impossible for the stem to twist round? British makers *must* add a laminated spring frame, and they will then have a bicycle to compete with the American twin-cylinder ones. They need not bother about weight, the American machines sell like 'hot cakes' out here, and most of them weigh close on 3 cwt. We keep hoping that our British makers, such as the James, Douglas, Royal Enfield, Sunbeam, A.J.S., Lea-Francis, etc., will send us out some machines up-to-date so far as Colonial requirements are concerned. We know they are now handicapped owing to the war, but they should be getting out designs and models all ready for rapidly turning out as soon as the war is over."



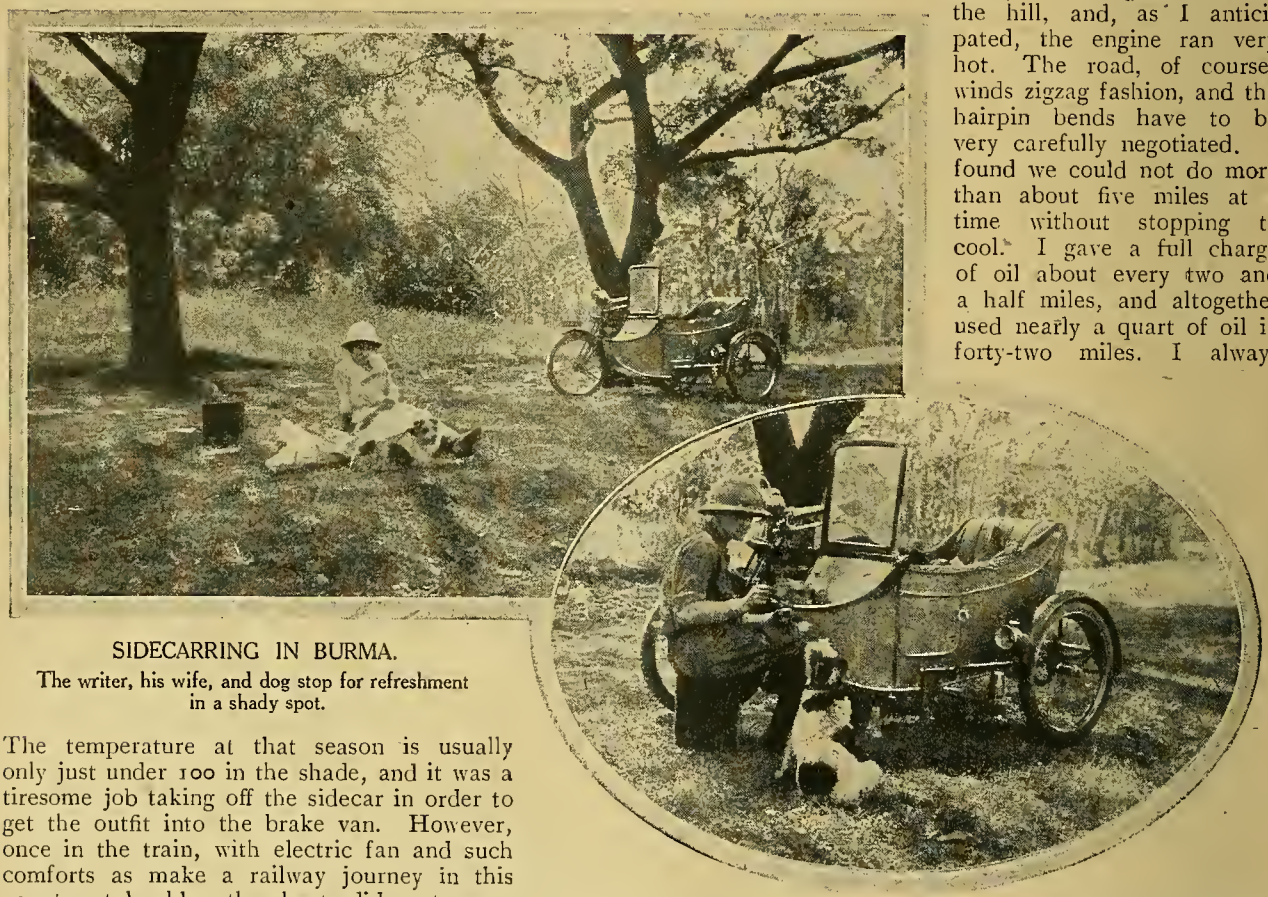
Rev. A. M. Walmsley, of Kandy, Ceylon, sends us the above pleasing photograph of his family aboard an A.J.S. outfit. On September 21st, 1916, an illustrated article, entitled "The Motor Cycle in Ceylon's Sunny Isle," appeared in these columns from his pen.

A MOTOR CYCLE IN BURMA.

A Journey to the Hills with a 4 h.p. Triumph Sidecar Outfit.

HAVING lived for over five years in this frightfully trying climate without a change of any sort, I did not feel that it was either extravagant or unpatriotic to take a fortnight's holiday last year; accordingly I obtained the necessary leave and made up my mind to journey to Maymyo, a hill station up-country, which stands about 3,600 feet above sea level. Being an enthusiast, and knowing that a road existed between Mandalay and Maymyo, I decided to try the hill-climbing powers of my Triumph.

My wife accompanied me, and we left Rangoon at midday on a Saturday for Mandalay by rail.



SIDECARRING IN BURMA.
The writer, his wife, and dog stop for refreshment in a shady spot.

The temperature at that season is usually only just under 100 in the shade, and it was a tiresome job taking off the sidecar in order to get the outfit into the brake van. However, once in the train, with electric fan and such comforts as make a railway journey in this country tolerable, the heat did not seem excessive.

The journey to Mandalay takes eighteen hours, and the country through which one passes is parched up and uninteresting. Arriving at Mandalay just after six on the Sunday morning, the first job was to attach the sidecar and fill up with petrol, then get *chota hazari* (small breakfast), and away. It took about half an hour to find the right road, and it was past eight before we really got going, and by this time it was getting very hot. The road for the first sixteen miles is almost flat, and, although the surface was bad, we did that much non-stop in fairly good time; we then had before us a climb of nearly 4,000 feet in about twenty-six miles. By this time the heat was intense, and the hill in front of us looked terrific. I stopped to cool at the foot of the hill, as I could foresee overheating troubles ahead. My sidecar is a Gloria No. 5, a heavy and luxurious affair, and we had a fair-sized hamper filled with sundry luggage strapped on the back; this, in addition to a spare tin of petrol, camera, drinks, ice, passenger, and dog, was a pretty good load for a 4 h.p. machine.

Frequent Stops to Cool the Engine.

I had Harcourt radiators on the cylinder, and used Triumph tropical grade oil. The engine was geared at 5, 7.8, and 12 to 1, and, needless to say, it was nearly all low gear work on the hill, and, as I anticipated, the engine ran very hot. The road, of course, winds zigzag fashion, and the hairpin bends have to be very carefully negotiated. I found we could not do more than about five miles at a time without stopping to cool. I gave a full charge of oil about every two and a half miles, and altogether used nearly a quart of oil in forty-two miles. I always argue that oil is cheaper than new bearings, and decarbonising is an easy enough operation, so I was not risking a seizure.

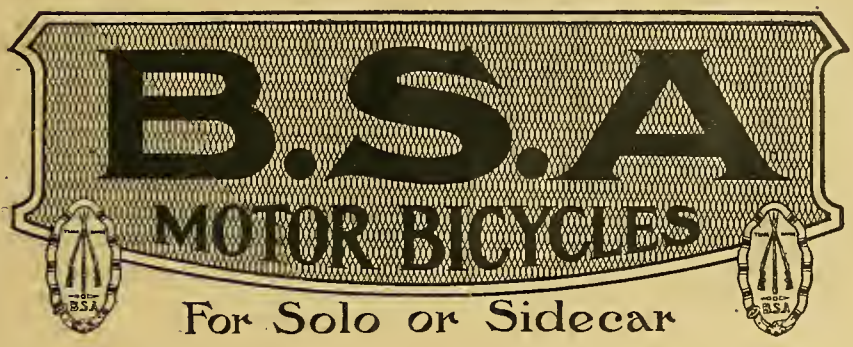
Restarting on the hill was a difficult job, the machine being a 1914 model with foot-controlled clutch. Handle-bar control, as fitted to the latest Triumphs, would have been a great advantage, and I shall certainly see that this is fitted to my next machine.

One of the many interesting things we saw on the road was a large number of wild monkeys, it being very amusing to watch them climbing about the trees in their natural state.

This road is, I believe, fairly frequently used, but, although we spent nearly five hours on it, we did not

THE MAINTENANCE

of the high standard of quality which has always distinguished B.S.A. products, and the ever increasing number of satisfied riders of B.S.A. Motor Bicycles who recommend B.S.A. machines to their friends have made the B.S.A. the most popular motor bicycle of to-day.



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THE BIRMINGHAM SMALL ARMS CO. LTD., BIRMINGHAM.

B.S.A. Cylinder Oil good for all motor cycle engines.

DUNLOP EFFICIENCY

Number Three.

THE DANGER OF TOO NEW TYRES.

It is bad for a tyre to be put on the road immediately it leaves the factory.

For this reason, the Dunlop stock rooms cover a huge area, and in them are to be found tyres of all sizes maturing in an even temperature, waiting their turn to become efficient representatives of Dunlop quality.

The oldest tyre in each size always moves first and in consequence each tyre reaches the Dunlop dealer in the condition to which it has been carefully matured to give the best service.

Dunlop dealers never have tyres in stock too new—or too old. You can trust a Dunlop dealer.

A Motor Cycle in Burma.—

see another motor vehicle of any description. Such things as wayside inns, or other places where one can get a drink or a meal, are unknown in Burma. It is necessary to carry a complete set of spares, and my box contained all that could ever be required for roadside repairs or adjustments. This is where a good roomy sidecar scores: the Gloria makers provide any amount of space for tubes, belt, repair outfit, etc.

Bullock carts on the road are numerous; they are the greatest of all road nuisances; they are frequently right in the middle of the road, and the driver invariably asleep. However, I did not get baulked on any occasion when rushing extra steep inclines.

The road nearly all the way was badly exposed to the sun, and when I occasionally jumped off the saddle to ease the load it was killing work running up by the side and steering.

Breakfast—Then More Climbing.

We struck a delightfully shady spot at about the twenty-first mile where a nice cool-looking stream was running; we decided to have breakfast here. While we breakfasted the engine was, of course, cooling, and the next few miles being only moderately steep we got along in fine style without having to use low gear. This did not last for long, however, as we were less than half-way up and were soon on terrific hills again; this meant more low gear work and careful handling. Several times when the engine threatened to konk out I managed to coax it along (by means of retarding the spark and reducing the air) to a place where restarting would not be so difficult; these places were none too numerous, and occasionally I had to stop and cool in some frightful places.

The sun was blazing on us the whole time, and we soon began to gasp for another drink; we therefore stopped a bullock-cart and obtained from the Burmese occupants some water—nasty stuff, quite hot. However, a little of the "produce of Scotland" from our flask to kill the germs made it a passable drink.

As we neared our destination a marked difference could be noticed in the temperature, but it was still pretty hot—a hill station at an altitude of only 4,000 feet in this latitude is only semi-temperate, the mornings and evenings being the only times when the climate is anything like it is at home.

On arrival at Maymyo a tiffin of strawberries and cream (the first we had tasted since leaving England) was very welcome.

We were, of course, very tired, but the journey was worth all the toil; the hill was considerably more than I bargained for, or I should not have attempted it with such a load. However, we enjoyed it, and derived a great deal of benefit.

The machine is none the worse for the severe trial, and is now running as well as ever. While in Maymyo we were out morning, noon, and night, and beyond decarbonising and fitting new valve springs no other adjustments were necessary.

A Few Notes on Sidecars.

Now for a word or two on the subject of machines. I consider that even the most fastidious rider should be able to find a machine to suit him from the excellent selection of British productions available.

I have, however, one growl to make with reference to sidecar attachments. Well, we have back wheels that will drop out on loosening two nuts, and cylinders that a child could take off, but sidecars, I venture to say, cause more bad language than any back wheel or inaccessible gear box.

Naturally, when riding alone one prefers the sidecar detached, so that one can get the benefit of comfort, speed, economy, less wear and tear and easy storage; but the toil of taking off a sidecar when one has five minutes to do it in, and the temperature is over 90°, reduces the advantages very considerably.

Now what I suggest is that a sidecar should possess two legs (which could be held up with clips when riding) so arranged that by means of the legs and the wheel the sidecar will stand by itself; then the attachment should be so designed that by withdrawing four bolts the bicycle can be wheeled away, leaving the sidecar standing.

This is my one and only grievance, beyond that I consider British manufacturers do us splendidly.

R. C. SCUTT.

Concessions to Military Motor Cyclists.

Should a Revenue Tax be Necessary for a Single Run?

IT was recently suggested that motor cycles owned by men serving with the Colours abroad should be kept in condition by those at home. Already the idea has borne fruit, the writer having heard of several cases where this is being done.

There is another matter in connection with machines owned by men on military service which requires airing and is of greater importance, and that is the taxation question. Among the pleasures of a few days' leave, one of the greatest to a war-weary man is a spin along the highways. The first thing he will have to do is to find a pound for the taxation of the machine and possibly five shillings for a driving licence. This is the penalty to be paid for the pleasure of riding his machine for perhaps a couple of days or less, say twice a year according to his luck and station. It is quite reasonable to advocate a concession of some sort to men in the Army who own motor cycles, and by whom a tax has previously been paid, and who already possess driving licences. In many cases taxation was paid and a licence taken out by men last spring who have never, or at any rate very rarely, been able to use their machines.

A correspondent has made a suggestion which everyone will endorse entirely, and that is a soldier should be able to use his old driving licence, which, in consequence of military duties, he may not have been able to make use of. In addition to this, showing his permit for leave should be a sufficient proof for his exemption of taxation. There should be no difficulty in adopting such a simple procedure. It would cause the authorities no additional work, and the action would be appreciated by all, while it would be a real boon to those men whose means are slender.

B7

Current Chat

Time to light Lamps

Special Features

GREENWICH TIME

Mar. 1st	...	...	6.7 p.m.
,, 3rd	...	...	6.10 ,,
,, 5th	...	...	6.14 ,,
,, 7th	...	...	6.17 ,,

OVERSEAS SECTION.

SPORTING REMINISCENCES.

DUG-OUT DEBATES.

Second-hand Market holds out.

In spite of the petrol restrictions, the sale of second-hand machines still appears good. A member of our staff who advertised his lightweight in last week's issue received several applications, and sold the machine without difficulty.

The R.A.C.'s New Name.

From March 1st the R.A.C. will be known as the "Royal Overseas Officers' Club." With the exception of members directly engaged in war work, the civilian element will be entirely eliminated, and several thousand members will have to seek hospitality elsewhere.

Sporting Reminiscences.

In this issue we publish the fifth instalment of "Sporting Reminiscences" by a veteran rider. Now that sports are suspended these chatty articles are, we are assured, very highly appreciated by those to whom competition days still exist as a pleasant memory.

Petrol Queries.

As enquiries continue to come in with regard to the petrol position, we may as well repeat the information we have already given once or twice.

The holder of a petrol ticket can continue to purchase from that ticket after March, and for so long as his allowance lasts. Thus, if he has still five gallons to draw, he can keep on drawing at the rate of half a gallon per week for ten weeks. There is no restriction which affects the using of a store of petrol on which duty has been paid, and a private owner can sell a small stock to a friend.

The new restrictions are not aimed at preventing motoring, but at saving supplies for naval and military requirements.

An Erroneous Report.

Mr. Wilfrid H. Hill, managing director of the County Chemical Co., Ltd., informs us that a paragraph appearing in several papers has caused the erroneous impression that he is about to resign his position as head of the County Chemical Co., Ltd. Mr. Hill has taken up work in connection with the National Service scheme, and is devoting the whole of his time to this for a few weeks, after which he has undertaken to give half his time. No alteration is to be made as regards his position with the above-named company.

All-British Magneto Industry.

The Irish Cyclist and Motor Cyclist informs its readers that—"For several years—in fact, since before the war—our contemporary, *The Motor Cycle* and its associated journals, have been agitating for an all-British magneto industry, and of recent months several other papers have taken it up."

Will it Come?

The prime mover on the lines of a petrol engine, having a cylinder and piston, is really an atrocious affair when viewed by the cool calculations of the mechanical mind. Yet how many have failed, hopelessly and bitterly, in attempting to evolve the only visible alternative—the internal combustion turbine. Invention is as yet in its infancy, and undoubtedly the petrol engine of to-day will prove the flintlock of to-morrow—merely a pioneer application of ignition and expansion. Turbine inventors, stick to it!

Keeping Pace with the Times.

No need for the adaptable motor cyclist to fall behind the time, as the illustration on this page, sent by Mr. W. Fleming, of Corinth Garage, 10, Stoney Lane, Birmingham, clearly shows. Mr. Fleming has ingeniously fitted his old Antoine engine with a mechanism for operating the inlet valves, which were originally automatic, thus bringing the old engine quite up-to-date.

An Antoine V-twin engine, the inlet valves of which have been converted from the automatic type to mechanically-operated valves.

Happy Islanders.

Mr. A. D. Sidgwick, a keen Guernsey motor cyclist, informs us that as yet they have no petrol restrictions in the Channel Isles.

Average Prices.

We give below the average prices of second-hand models offered for sale in the last issue of *The Motor Cycle*. Difficulty in obtaining a sufficient number of one particular model often arises, owing to the fact that many advertisers omit some of the most essential details.

Make.	Year.	H.P.	Average for last week.	Latest weekly average obtainable.
A.B.C.	1914	3½ T.T. 3-sp. s-car	—	£70
A.J.S.	1915	6 3-sp. sidecar	£85	—
,,	1916	4 3-speed	—	£70
,,	1915	2¾ 2-speed	—	£40
Ariel	1916	5 3-sp. sidecar	—	£76
Bradbury	1914	4 2-sp. sidecar	—	£50
Brough	1916	3½ 2-sp. sidecar	£66	—
,,	1915	3½ 2-speed	£50	—
B.S.A.	1916	4 All-chain s-car.	£68	—
,,	1915	4¼ 3-sp. c-chaft	£57	—
,,	1914	3½ T.T.	—	£32
Calthorpe	1915	2¾ 2-speed	£25	—
,,	1914	4 3-sp. sidecar	£34	—
Chater-Lea	1915	8 3-sp. sidecar	£45	—
Clyno	1914	6 3-sp. sidecar	—	£65
Douglas	1916	2¾ 3-speed	£53	—
,,	1915	3¾ T.T.	£48	—
,,	1914	2¾ two-speed	£35	—
,,	1915	4 3-sp. sidecar	£60	—
Enfield	1916	6 combination	£90	—
,,	1915	6 combination	£85	—
,,	1916	3 two-speed	£45	—
Excelsior	1914	7-9 3-speed	£35	—
H.-Davidson	1916	combination	£79	—
,,	1915	combination	£60	—
Indian	1916	5 T.T.	£75	—
,,	1915	7	£42	—
Ivy	1915	2-stroke	£24	—
James	1915	4¼ 3-sp. comb.	£58	—
,,	1916	4¼ 3-sp. comb.	£75	—
Levis	1916	2½ 2-speed	£34	—
,,	1915	2¾ 2-speed	£20	—
Matchless	1915	6 combination	£75	—
New Hudson	1915	4 3-sp. comb.	£45	—
New Imperial	1916	2½ 2-speed	£34	—
Norton	1916	3½ T.T.	£45	—
P. & M.	1914	combination	£57	—
Premier	1915	3½ 3-sp. sidecar	£40	—
,,	1914	3½ T.T.	£38	—
Quadrant	1914	4½ 3-speed	£30	—
Radco	1914	2-str., 2-speed	£21	—
Rover	1916	3½ T.T.	£48	—
Royal Ruby	1914	3½ twin T.T.	£35	—
Rudge	1916	3½ Multi	£45	—
Scott	1916	3¾ combination	£68	—
,,	1915	3¾ combination	£63	—
Sunbeam	1916	8 combination	—	£100
,,	1916	3¾ combination	£84	—
,,	1915	3¾ combination	£80	—
Triumph	1916	4 countershaft	£63	—
,,	1915	3½ 3-speed	£55	—
,,	1914	3½ T.T.	£40	—
Velocette	1916	2½ 2-stroke	£30	—
Zenith	1915	8 combination	£70	—

SUNBEAMS ROMP UP

Clapham Park, S.W.
24/8/16.

Dear Sirs,

Thought you'd be interested in the following remarks of one, in fact the best machine I've ever ridden—1914 3½ Sunbeam Have ridden same this last five or six months every day, wet or fine, and never had the slightest trouble. Previous to this been tearing about despatch special police midnight. In fact machine has had some of the roughest work possible and practically looks as good as new. Only last week was offered £70 for same top of Wanderers Hill, Brighton Road, a gentleman seeing me come up on top with three up, sidecar being heavy coachbuilt.

Have also several times been offered near and in one case over this amount. There seems nothing that this machine cannot do. Hill Climb (6¾ scale) five weeks back romped up with top of carburettor lost and petrol feeding very irregular.

Best wishes,
Yours faithfully,
H. V. P.

Prospective buyers are advised to have their names recorded on our Waiting List.

Catalogue and full particulars sent on application to

JOHN MARSTON, LIMITED, 11, Sunbeamland, WOLVERHAMPTON.

NOTICE

"ONE of the best compiled and informative booklets that has yet come into our possession is the brochure just issued by Messrs. J. A. Prestwich & Co., Ltd., of Northumberland Park, Tottenham, London, N., dealing with the 6 h.p. and 8 h.p. J.A.P. engines. The booklet is profusely illustrated, and shows in a perfectly clear manner the functioning of every part of the power unit, and contains a mass of valuable information which should prove of the utmost utility to the users of these popular power units. Instructions for the complete overhaul of the engine, valve timing, ignition setting, and other details form a large section of the booklet, which also contains an illustrated price list showing pictorially every part of the two-power units. It can be obtained, post free, from Messrs. Prestwich, and it should certainly be in the hands of every J.A.P. engine user."

VIDE PRESS.

SPECIFY ALWAYS
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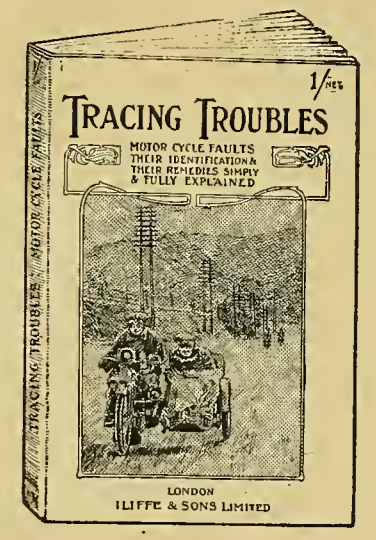
JAP

TRACING TROUBLES

MOTOR CYCLE FAULTS, THEIR IDENTIFICATION AND THEIR REMEDIES SIMPLY AND FULLY ∴ ∴ EXPLAINED ∴ ∴

Third Edition

Revised and brought up to date.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TRACING TROUBLES
MOTOR CYCLE FAULTS THEIR IDENTIFICATION & THEIR REMEDIES SIMPLY & FULLY EXPLAINED
LONDON
ILIFFE & SONS LIMITED

THIS handy little volume deals with all the faults to which motor cycles are liable, explains how they can be easily diagnosed, and shows how they can be rectified. Every conceivable cause of trouble is dealt with, and the remedy for it carefully explained. It is written in simple language by a practical motor cyclist of long experience, and fully indexed for ease of reference.

¶ The Third Edition of this handy book for motor cyclists is now on sale.

¶ All obsolete matter has been taken out, and new matter added to bring it up to date.

¶ The Section dealing with Two-stroke Motor Cycles has been considerably enlarged and rearranged.

¶ A new section dealing with Electric Lighting Dynamos has been added.

Price 1/- net. By post, Home or Abroad, 1/2.

FROM

Iliffe & Sons Ltd., 20, Tudor Street, London, E.C.

and all leading booksellers and bookstalls. *(Remittance should accompany orders sent by post).*

R10

The National War Funds.

At the week-end the principal war funds stood as follow:

The Prince of Wales's Fund (distributed £3,539,719)	£6,037,951	0	0
British Red Cross Fund	6,204,344	0	0
Tobacco Fund	125,904	0	0

Snow Driving and Driving Snow.

Those interested in bad weather motoring will find in the current issue of *The Light Car* a highly amusing article entitled "My Ideas on Snow Driving." The author was evidently "up against it" in no mean form during the recent cold snap.

Motor Cycles and how to damage them.

Many riders, having no petrol, are filling in their few leisure hours by taking their machines to pieces and tinkering with them. Judging by the effects of some people's tinkering in the way of round nuts and crossed threads, there will be some rare old crocks for sale after the war.

An Unusual Tyre Experience.

On stopping to help a novice struggling at the roadside over a tyre repair, we were informed that he had experienced four punctures—one a huge hole—in the last four miles, and that, to add to his difficulties, he had lost one of his tyre levers. Examination revealed the fact that the missing lever was actually *inside* the inner tube! It had evidently fallen into the cover during the first repair, cutting its way to the interior of the tube when the machine was ridden—hence the large hole. There was nothing for it but to make another tear to get it out. Naturally the novice felt foolish, but our sympathies were with him. Once we ourselves lost a small metal-handled penknife, ultimately finding it snugly tucked between the cover and the tube. There it had ridden for 1,000 miles before finally chafing through the tube.

Well Known in the Trade.

We regret to announce the death of Mr. T. J. Delo, a director of Messrs. Hazlewoods, Ltd., who died on Friday evening last at his residence, 7, Avondale Road, Earlsdon, Coventry.

Mentioned in Despatches.

Among the men mentioned in despatches in *The Gazette* we notice the name of Capt. A. M. Low, R.F.C., who has done valuable scientific research work for the Government.

["....."?]

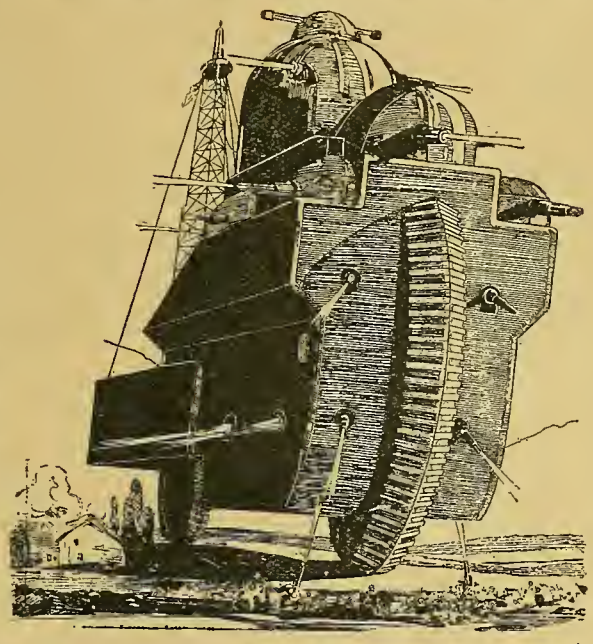
We have been amazed at the number of replies received to the simple request for a suitable title for a picture reproduced in our issue of February 15th showing a donkey gazing over a wall very dejectedly at a Bradbury motor cycle, a church occupying the background. We hope to name the winner next week. "Ancient and Modern" and "Beauty and the Beast" are common suggestions. But some are witty and original. We ought to add that many are by no means complimentary to the Petrol Control Committee.

The Cycle and Motor Trades Benevolent Fund.

The usual monthly meeting was held on February 22nd, and the treasurer's report showed a balance at the bank and in hand of £2,741 13s. 6d. A list of applications for relief, containing fifty-one names, was dealt with, and in every case but one grants were made.

Geography for the Motor Cyclist.

The double centre page map in this issue will probably reveal one or two surprising facts to home readers. It will be seen that, though enormous areas throughout the Eastern Hemisphere are rideable, few lands can compare with the British Isles for anything in the way of road surfaces. Sand, dust, potholes, and narrow roads are the common order, and our British highways and byways, though to-day battered by military traffic, would still be hard to beat from the motor cyclist's point of view.



A GERMAN CONCEPTION OF A "TANK."

No doubt the British Tanks have stirred the imagination of all people, but they must have instilled terror into the heart of the Huns to cause them to perpetrate the "nightmare" illustrated. The sketch, which originated in Germany, shows a single track leviathan, which preserves its balance by means of a gyroscope.

Lightweights and Detail Design.

There is really no excuse for the utter thoughtlessness exhibited in the minor points of design of many lightweights. In the case of one little machine we know—excellent in most respects—the task of replacing the back wheel requires two strong men, one to spring open the forks, while the other manipulates sundry small washers and clips into their respective places.

On another model an adjustment of the chains necessitates taking the machine to the local smithy to have the brake rod drawn out or shortened, no adjustment being provided. Small points of this sort weigh heavily in one's judgment when the time comes for deciding whether or not to buy another machine of the same make.

The Compact Magneto in the Flywheel.

The possibility of flywheel magnetos being used on lightweight machines in particular after the war is discussed in a leading article this week.

"The Critics" Absent.

In place of "The Critics" usual article, we publish an article this week on the subject of "Dug-out Debates"—motor cyclists' or would-be riders' debates, of course. "The Critics" will resume their criticisms next week.

Blackpool's Motor Volunteers.

The Blackpool Motor Volunteers recently spent a pleasant evening at their headquarters, when, at the invitation of the Commandant of the corps, 150 wounded soldiers were invited from the Convalescent Hospital to a "hot pot" and concert.

On Thursday last the Blackpool Volunteers were "sworn in," every man on parade taking the oath. The section appears to have been very prosperous. Several motor cyclists are still required to fill the places of those who have joined the Motor Transport.

Yet Another Name.

The Royal Overseas Officers' Club, formerly the R.A.C., has been re-christened, on account of its initials, the "Rook." No doubt the new designation originated among the late birds who come home to sleep.

Testing Substitutes.

In referring to the desirability of a road and bench test for petrol substitutes, Messrs. Archibald Vickers, Ltd., 28, King Street, Covent Garden, the vendors of Petrolior, write us setting forward one or two suggestions which they think would enable the judges to come to a fair decision. Their suggestions are:

1. Ask for a defined specification of the material offered, viz., flash point, specific gravity, and distillation chart, initial and final evaporation points.
2. Having secured these figures, purchase the material in the open market, and then, after confirming the bulk material is up to the specification given, start the tests.

Pioneer Journalism.

We always follow with keen interest the budding sporting journals of our colonies, but the following inscription to a photograph reproduction really beats us: "Pole shows the boat used to set traps on as an easy means on the water to drown the rats which dive under being caught." The reader really need not trouble about not having the illustration to go by, as it resembles a futurist effort, and might be a motor cycle hill-climb, a Turner sunset, or a trench under fire. Since the journal covers every phase of sport, art, and war, not forgetting births, deaths, and marriages, can any reader suggest what the passage means? The allusion to "rats" rather makes us think that the editor is trying to pull somebody's leg.

Riding Conditions of

AN INSTRUCTIVE GUIDE TO THE ROAD AND CLIMATIC CON

AFTER the war motor cycle manufacturers will be in search of new markets Overseas. Thousands of prospective riders scattered the world over will welcome the enterprising British manufacturer who shows interest and a desire to cater for their needs. The motor cycle is an economical vehicle of proved reliability, and it is simply a question of embodying in its specification items of practical value to suit the road and climatic conditions. The accompanying map is a guide to manufacturers in supplying the right article, based upon the demands of motor cyclists in the districts enumerated.

HOW TO READ THE MAP.

The black portions of the map mainly indicate mountain ranges. Through some of the ranges rideable passes may exist, but, owing to the large area covered, it is impossible to show isolated roads.

The shaded portions indicate regions which are as yet unsettled. For the reason above mentioned the boundaries must not be taken as exact. Certain of the shaded areas may have been crossed by pioneer riders.

The white areas indicate the present potential field of buyers of motor cycles. Here motor cycles are now in regular use; here there are chances of immediate development.

The figuring and lettering need no explanation. The figures indicate the general nature of the country; the letters indicate local conditions, and the mechanical features therefore desirable. Simply note the locality and the figure and letters nearest to it, then refer to the list.

GENERAL NATURE OF THE COUNTRY.

1. Conditions similar to the British Isles.
2. Flat country. Pot-holes.
3. Clay or mud. Riding conditions moderate in dry weather, but bad during rainy season.
4. Deep sand or dust the general order.
5. Rocky country. Water-splashes numerous. Sand and ruts.
6. Tropical to semi-temperate. Monsoons. Roads vary, but are generally narrow and dusty. By-roads bad.
7. Chiefly bush or desert tracks. Limited riding.

Eastern Hemisphere.

ALUE TO MANUFACTURERS AND MOTOR CYCLISTS ALIKE.

THINGS TO NOTE AND AN ACKNOWLEDGMENT.

Note the dark and distant places into which the military motor cycle has penetrated. This stands as a striking tribute to the efficiency and adaptability of the modern machine.

Note—manufacturers particularly—how small England is compared with the remaining portions shown white. Here we have our crowded millions, but only a few are buyers. There civilisation is scatered, but almost every man can afford to buy. And remember that the shaded area is gradually receding as civilisation creeps up.

We desire to express our thanks to Mr. T. Silver, of Quadrant fame, and to Mr. S. L. Bailey, of Douglas Bros., both of whom have toured extensively in the interests of their firms, for assistance with this map. Thanks also to our distant readers for the information their letters have conveyed. If anyone of them finds we have blacklisted his district, which he considers a motor cyclist's paradise, let him write us. His data will be carefully filed.

DESIRABLE POINTS IN DESIGN.

a. **Deep mud. Ample mudguard clearance.**

b. **Tropical. All black finish. Coachbuilt sidecars not satisfactory. Rubber goods apt to perish.**

c. **Rough country. Ample power. Good ground clearance. High magneto position. Positive drive. Spring frames or spring seat-pillars preferable. Strong sidecar frames and attachments. Strong rims and spokes.**

d. **Thinly populated. Large tanks needed. Full equipment of spares and tools.**

e. **Dust. Large tyres and wheels. Air intake preferably arranged with extension.**

g. **Adjustable air supply to suit greatly varying altitudes.**

h. **Roads good to moderate round coast.**

x. **Lightweight machines suitable for use—probably about cities.**

W. **Where motor cycles have been successfully used for military purposes.**

THE MAGNETO:

Its Function, Design, and Construction.

AT a meeting of the Coventry Engineering Society on Friday evening last, a lecture was delivered by Mr. E. A. Watson, M.Sc., on "The Magneto: Its Function, Design, and Construction." Mr. Watson is director and technical manager of the M-L Magneto Syndicate, Ltd., and showed a splendid grasp of his subject. The interest taken in the lecture was evidenced by the large audience which assembled at the Coventry Technical Institute to hear the lecture, which was to a certain extent supplementary to one delivered by Mr. A. P. Young (fully reported in *The Automobile Engineer* of March, 1915).

At the outset, the author remarked that it was possible to regard the electric spark given by a magneto or other ignition apparatus as being simply a small source of intense heat corresponding to the hot points produced by the old-fashioned ignition tube, but it was by no means certain that the function of the spark was purely thermal, as it was believed by some authorities that ignition was to some extent due to emission of ions from the electrodes, and it was stated on good authority that ignition could be produced by a brush discharge without the passage of any spark at all.

The Effect of the Spark on Engine Power.

Experiments of his own corroborated the view that the rate of propagation of the explosion, and consequently the h.p. developed by an engine, did not depend on the energy of the spark, provided the spark was of sufficient intensity to ensure ignition. If the mixture, however, were weak and the spark intensity too low, misfiring might occur, in which case the h.p. dropped off. There appeared to be little doubt that with an engine running at a normal working temperature the energy output of even the smallest magneto was ample for the purpose. Under starting conditions, however, the problem was more difficult, as it certainly required more energy to ignite a cold gas than a hot one, especially if the fuel used were of a high flash point, so as to be present in the cylinder in the form of a spray or mist rather than a vapour. Some years ago he experimented with a small influence machine which was arranged to give an oscillatory spark, *i.e.*, a spark of an extremely high temperature, but of very short duration, so that its heat content was low. For firing a gas, this was the most efficient form of spark known, but it had the peculiar property that it could be passed through an inflammable liquid or solid such as petrol, or through gunpowder, without producing ignition, merely scattering the particles of the substance on either side, due to the mechanical disruption of the discharge.

Starting in Extreme Cold.

With this form of igniter, although the engine ran perfectly in the ordinary way and when once warmed up, a very great difficulty was experienced in starting on a cold, frosty day, and this was probably due to the fact that the petrol in the engine cylinder was present in the form of a mist or spray rather than in the form of vapour. As these experiments were carried out in 1911, when the flash point of petrol was considerably lower than it was at the present time, the importance of the energy in the spark was probably greater now than at that time, and he was of opinion that the size of the magneto required by a given engine was fixed, not by the normal running conditions, but by the conditions which prevailed when the engine was being started. The position of affairs in the cylinder at the moment of ignition corresponded to the presence of a small amount of very hot gas situated at the points of the sparking plug. This hot gas parted with its heat to the surrounding mixture, thereby warming it up, and if the temperature to which the surrounding mixture was raised was sufficient this mixture in turn would be ignited, and the explosion would spread throughout the cylinder, but if not the flame would not spread and no explosion would occur. Supposing the heat zone produced by the electric discharge to be progressively diminished, it would be seen that, whereas its volume would diminish as the cube of its linear dimensions, the area of its surface would diminish as the square, so that the heat passing outwards through a unit area of surface would diminish as the linear dimensions. The smaller the zone, therefore, the less would be the temperature to which the surrounding gas was raised, and if the zone were diminished beyond a limiting size no ignition would occur, this corresponding to the minimum spark energy which would produce an explosion.

Rapid Liberation of Spark Energy.

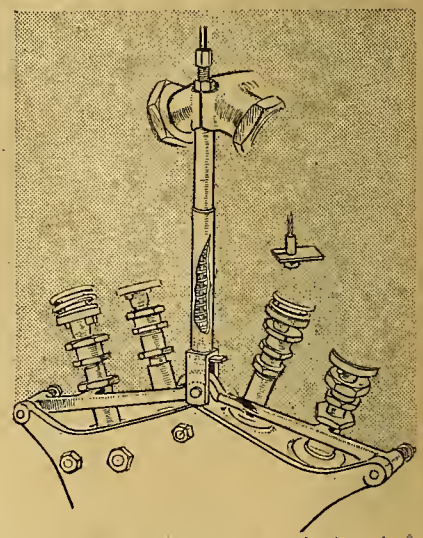
It was also obviously an advantage that the spark energy should be liberated in as short a space of time as possible, as if this liberation took an appreciable period dissipation of energy from the heat zone would be going on all the time, and the temperature would be less than if the energy had been liberated instantaneously, consequently it would require a greater total amount of energy to produce ignition.

In discussing the means by which these conditions could be best met in the construction of magnetos, he incidentally emphasised the importance of suitable cam design. It was important, he said, when a magneto was employed which had short cam segments, firstly to see that the separation of the contact points was sufficient to keep them open during an appreciable angle, and, secondly, to take care that all the sparking plugs (if the engine was a multi-cylinder one) were set to the same gap, as the presence of one plug set to a small gap might cause the next one to it in sequence to misfire.

The lecture was illustrated by a large number of lantern slides, and, in the discussion which followed, Mr. A. P. Young pointed out the advantages of the inductor type of magneto.

A J.A.P. IMPROVEMENT.

THE J.A.P. exhaust valve lifter mechanism has been considerably improved in the later models. The lifter arms are now much stiffer; the release spring is totally enclosed, so that the wire is protected. The supports of the two levers form a portion of the timing gear cover; the arms are prevented from rattling by means of a short spring; and there is a large hexagon ring on the exhaust tappet body, which is lifted by the projection on the exhaust lifter arm.

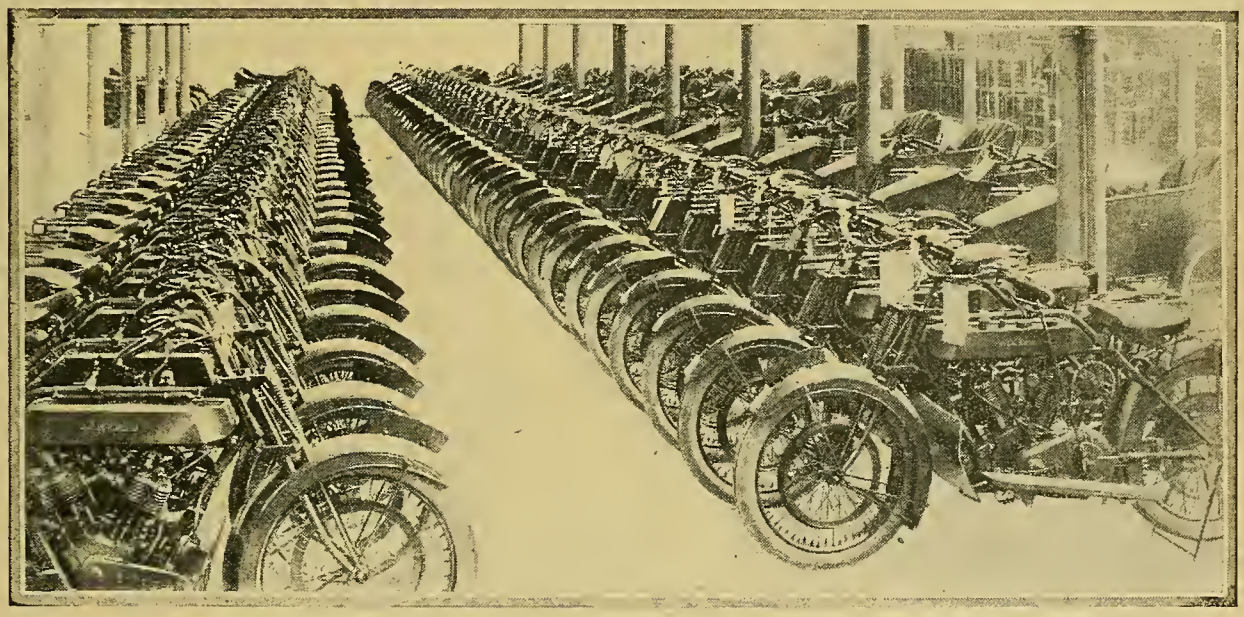


The improved valve lifting mechanism of the 5 h.p. J.A.P. engines.

Enfields for the Russian Army.

WE mentioned in our last issue that the Russian Government order for several hundred motor cycles, which has been in the air for some time past, was a week or two ago distributed among different British motor cycle manufacturers. We are now able to illustrate the first batch of machines which have been completed to that order, the product of the Enfield Cycle Co., Ltd., Redditch. All machines built for the Russian Government have to conform to a specification laid down by the military authorities. One of the points stipulated by the Russian authorities is that each machine shall have a ground clearance of not less than 6in. (manufacturers interested in Overseas markets should carefully note this fact). As a result, all the Enfield models have the Colonial type of frame.

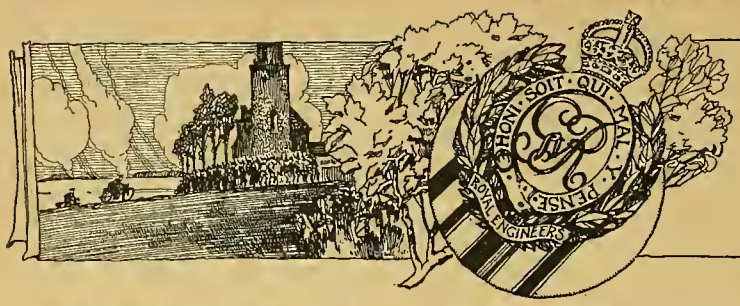
Other departures in connection with the machines illustrated are the fitting of semi-T.T. pattern handlebars with outside cables and controls in place of the V-shaped handle-bars of the Enfield with enclosed cables. There are no plated parts on these machines, the mudguards, tank, and frame being finished to match in Service green. All the Enfield solo models are fitted with 6 h.p. engines, whilst the sidecar machines have 8 h.p. engines. In general design, as will be gathered from the photograph, the machines are standard, the new type of fork with double spiral spring in front being, of course, used. The Palmer Cord tyres on the machines are 700 × 80 mm. section. The mudguards of the standard Enfield have always been of liberal dimensions and flat, so rendering them suitable for extremely muddy conditions.



Part of a large batch of 6 h.p. and 8 h.p. Enfield solo and sidecar machines completed to the order of the Russian Government.

Accessibility on the Road.

IT is odd that so few manufacturers really work out accessibility from the road as opposed to the shop point of view, writes "Road Rider." Beyond question, the integral items of the average machine fit together very comfortably when they are lying loose on a bench, or when each component is brought into the erecting shop and strewn round the fitter who faces the skeleton machine on its erecting stand. But it by no means follows that the same parts are accessible on the road or in a private garage, when a single component has to be removed from a machine in being. For example, I broke a kick starter pinion the other day, and the designer concerned, who is an exceptionally clever man, besought me to fit without delay the presentation spare which he forwarded by return, assuring me that it was only a fifteen minute job; he evidently did not wish people to see one of his machines humiliated by the push and jump start. I took him at his word, regarding him as trustworthy, and having an odd quarter of an hour tackled the job. It took me rather over an hour to get at the broken pinion, seeing that perhaps a couple of dozen nuts had to come off, and, whether by accident or design, two of the bolt heads were outside, and the hidden nuts could not be reached with any spanner in his kit or in my kit until the exhaust pipe and a few other oddments had been removed to obtain the necessary access. These two nuts multiplied the time necessary for the job by something like 600%. and his false estimate was presumably due to the fact that he had never seen a pinion refitted, except to a loose gear box. Such details will only be perfected when a special man is employed on each model of each factory to tackle all such repair and adjustment jobs against the watch, and that with the tool kit provided for customers.



MILITARY NOTES.

A TRIBUTE—MEN OF THE "TANKS."

Men of the "Tanks," we give you thanks
For all that you have done.
Through shot and shell you've stuck it well,
Your work is not all fun.

Along the Somme, midst shell and bomb,
Your mighty craft did steer;
The Hun, he flew when meeting you,
His face went pale with fear.

Ye "Tanks," roll on, for you're *très bonne*,
Your mighty strength will show
The Huns the way we'll win "The Day";
You've got them on the go.

Men of the "Tanks," we owe you thanks,
We lift our caps to you
For deeds you've done against the Hun-
And deeds you mean to do.

1st Air Mechanic R. L. Nye,
D.R., R.F.C.

IN THE MOTOR BOAT PATROL.

WE have received a very interesting letter from Chief Motor Mechanic G. Bell, who is in the Motor Boat Patrol. Bell was formerly in the employ of the New Hudson Cycle Co. for fourteen years, and competed with success in a number of competitions, including the Scottish and English Six Days Trials. His last success was in the Birmingham Club's Trial last Easter Monday, when he won a gold medal on a Harley-Davidson. He was at that time foreman over the motor cycle repair department at the Colmore depot. He mentions that the engines he is now using are just a little different from the ordinary motor cycle engines, for they have six cylinders and an open crank case with two sets of cams on the shaft, one set for "speed ahead" and the other for "astern." Another good thing which he loves as a motor cyclist is the water-cooled exhaust valve—the water actually passes down the centre of the valve. C.M.M. Bell was moved to write us from abroad on seeing the photograph of his friend, Sergt. A. Fielder, M.M.G.S., who is stationed in India.

A GRUMBLE AT GENERATORS.

WHEN we read the letter of T. P. Dixon, 2nd A.M., R.F.C., for the first time, we were surprised at one thing. He had apparently omitted to mention the great bugbear of life in France, that which is with men always, and that which all motor cyclists write about—mud. But our surmise was premature, for tucked away at the bottom of the letter was the following brief and forceful announcement: "P. and M. still wandering in mud in France." In the course of his remarks he says: "If lamp manufacturers would only make generators as good as a P. and M. bicycle, riding at night would be a pleasure—but they don't. It seems wonderful to me that motor bicycles stand up at all on these roads, as the holes in places are at least a foot and a half deep, but they don't frighten the P. and M.; it just bumps in, jumps out, and away we go."

T. P. Dixon, 2nd A.M., R.F.C., speaks glowingly of the behaviour of his P. & M. on the pot-holey roads of France.

CYLINDER BORING IN FRANCE.

SUCH delicate operations as boring cylinders on a 5in. Drummond lathe are not beyond the capabilities of M.T. men in the different workshop bases in France. At the motor cycle workshop of which Capt. Gordon I. Francis is in charge, this operation is by no means

Capt. G. I. Francis, A.S.C., M.T.

uncommon, though cylinder boring is tricky, and usually necessitates a heavy lathe mounted upon a rigid base. We recently had the pleasure of a chat with Capt. Francis, who was home on leave for a few days, and naturally, as keen motor cyclists, our conversation drifted to the design of motor cycles. He confirmed what had been stated in these columns on a previous occasion, viz., that during the present winter weather the lightweight was the more popular mount, on account of its stability and also of its ease of starting simply by paddling along the ground with the feet, but when the warmer weather and hard roads arrived the heavyweight machine again came to the front. Troubles with motor cycles are by no means absent, as the number awaiting overhaul at the different bases testifies.

Capt. Francis will be known to many of our readers, as he was a very successful rider of a Lea-Francis motor bicycle in pre-war days, obtaining medals (with his stable companion, Lt. Norman Lea, now in the R.N.A.S.) in the Scottish and English Six Days Trials and also the Colmore Cup Trial.

RAPID PROMOTION.

W. B. LITTLE, whose rapid promotion in the Army has given him an easy first over motor cyclist officers, is now Brigade Major. We shall not be astonished, in view of his consistent advancement, to see him gazetted a Colonel ere long.

ESSEX CLUBMAN IN FRANCE.

ONE of the oldest members of the Essex Motor Club is Sgt.-Maj. B. C. Siffken, who is now in France with the A.S.C., M.T. He has written us a most interesting letter on the design of Overseas mounts, and particularly those used in the war zone. The substance of Sgt.-Maj. Siffken's letter is that still a lot remains to be done before we shall have successfully tackled the problem of a real hard-work-knockabout machine for use under the worst possible conditions on thoroughly bad roads. He attributes many of the broken sidecar frames to bad brazing in the brazing shop, and incidentally remarks that as a result of this lapse the sidecar in France has not the best of names.

TRANSFERS.

A NUMBER of men in the Ambulance Service in France who are fit for general service are being sent home with a view to joining some combatant unit. Several such have written to us for advice with regard to joining one or other of the motor sections.

IN THE R.F.C.

B. ALAN HILL, the Indian, Rudge, and Humberette driver, who, at the commencement of the war, served six months in the British Red Cross Society as an ambulance driver, and on his discharge became a member of the staff of *The Motor Cycle*, is now at the Reading School of Instruction for Equipment Officers in the R.F.C.

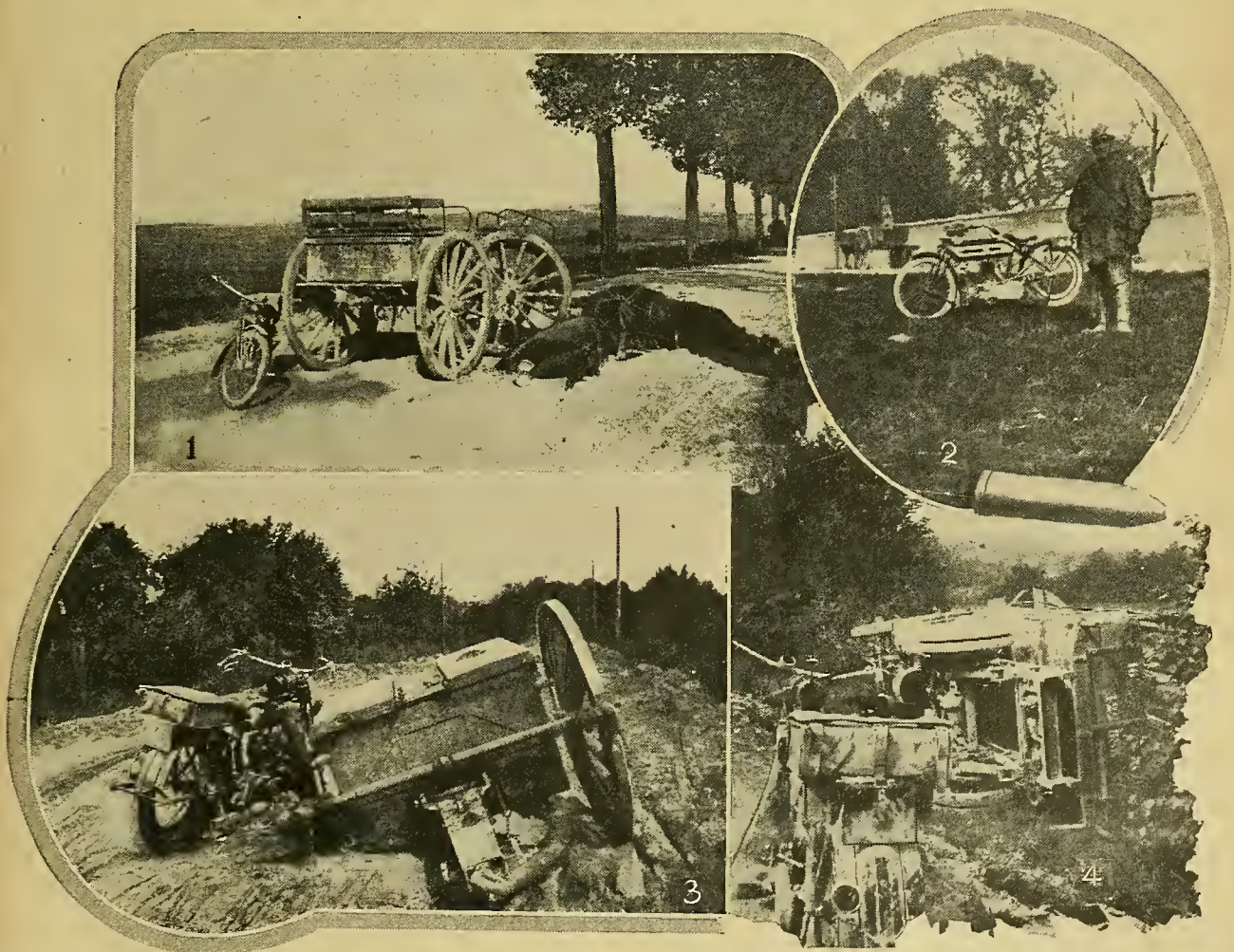
STILL FAITHFUL TO THE MOTOR BICYCLE.

WE have received an interesting letter from Lt.-Col. D. F. Nicholl, D.S.O., R.A., of which we give an extract: "One good thing about this hard weather is the delightfully dry, clean roads one gets now. I have done several little runs on one of our Triumphs lately, and find it invigorating and delightful—if one could only leave one's ears at home on the mantelpiece to keep warm! It is a great joy to feel a good engine between one's legs. I'm bound to confess that, beyond the convenience and comfort of it, being driven in a car by a mechanism-murderer is somewhat of a trial to me. *The Motor Cycle* arrives with great regularity, and is most welcome."

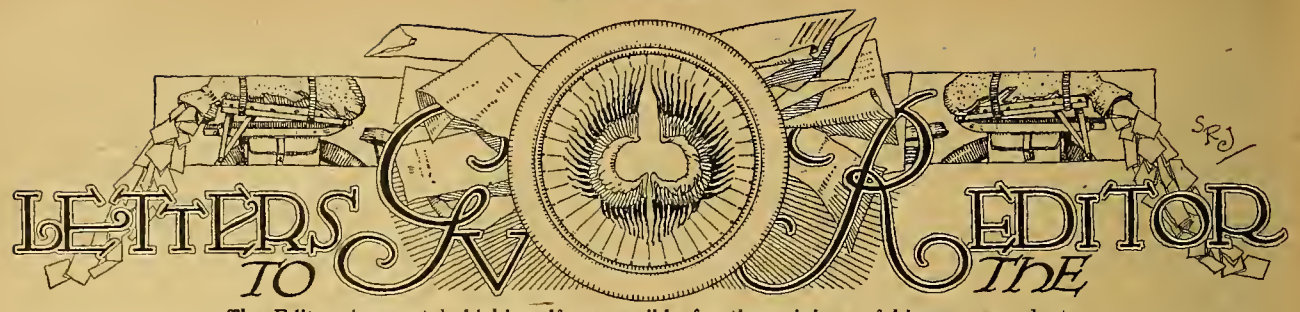
Rex Mundy, the well-known competition rider, is now in charge of an A.I.D. station near London.

IN THE TRACK OF WAR.

A Series of Exclusive Photographs taken in the Neighbourhood of Verdun, revealing in a Realistic Way the Grim Realities of War.



(1) Death lurks even on roads which look peaceful enough, for the trees do not appear to have been touched by shell fire. The picture was taken within a mile of Verdun. (2) A despatch rider of the French Army in the Champagne sector cautiously approaches an unexploded shell. (3 and 4) "Accidents" at the same "unhealthy" corner as No. 1. "All the elements," says our correspondent, "water, mud, shell fire, bad roads, holes, etc., are against the much tried motor cyclist struggling along with a machine continuously in low gear."



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address

MOTOR-ASSISTED BICYCLES.

Sir,—Advancing years compel me, a lifelong cyclist, to use a motor-assisted bicycle. Having had experience of two such, I am convinced that nothing less than 1½ h.p. is sufficient to carry me up gradients of 1 in 13. And these, which are frequently met with, are just the ones on which assistance is most needed. May I express the hope that inventors will provide for the declining strength of veteran riders? CYCLIST.

Torquay.

NAPHTHALENE BLOCKS.

Sir,—During the first week in January I journeyed to Richmond, Yorks., and back *via* Ripon—a distance of 504 miles. I used for the first time naphthalene blocks, about twice the size of a ball. Probably I used five on the whole journey. On my return I was much astonished to find no deposit on the valve caps, except a film which I rubbed, or rather wiped, off with a duster. I have known the time when I have been compelled to decarbonise at 400 miles with my 3½ h.p. Alldays-Matchless. I am not aware that there was any increase in power. There was no decrease, and I am satisfied as to the good value of naphthalene balls. The usual disclaimer. R. G. HOWARD.

CONTROL AND RATIOS OF COUNTERSHAFT GEARS.

Sir,—Is it possible that the Sturmey-Archer Co. will alter the control of their well-known gear box (which is excellent in my opinion)? I think that for foot control for touring or long distance runs on open roads it would be more convenient to have the high gear engaged when the lever is in the low position, and the low gear would be when the lever is high up. This is because the usual change (in speed) from top to middle or from middle to top would be a better reach for the foot.

I agree that for the hard D.R. conditions it is quite different. I should be glad to hear the opinions of good English riders.

Another question: I find the gears (Sturmey-Archer) too far apart for solo work; that is to say, 5.7 to 1, 8 to 1, and 13 to 1 are all right for sidecar, but for fast touring I should like something like 10, 6, and 4 to 1, the middle and top gears being close together. Is it possible to obtain pinions or box like this from the Sturmey-Archer Co.?

Paris. M. DE L. H. E. PLATEAU, E.M.

FAILURE TO START.

Sir,—I had a rather interesting experience which I think might come before your readers. It is as follows:

During the cold snap I tried to start up my Triumph (1912 three-speed). I had been riding it in the morning and it was working well. I injected spirit, and it refused to fire, which is a thing which seldom happens to me. I examined the magneto armature, but it was not stuck, then the high-tension wire, and then the plug (a four-point radiating from the pole). When horizontal on the cylinder top it sparked well; when put back the engine would not start. I emptied the carburetter, looked at the valves, timing, and everything there is to look at—called it everything but a M.C. I took the plug out, and tested it five times in the threequarters of an hour that I played with it. I washed it out with petrol, and still it would not fire in the cylinder. Then I took it out for the last time, and, as I was knocking on the ground, shifted it upwards, and saw that a drop of water had run down one of the points and established a connection which prevented it firing. When in a horizontal position the water ran back, and it fired. I removed the water and the engine started up. I may also add that during the time I had scraped and cleaned the plug points. I am not a novice, and felt very sore in being fooled by such a thing.

Sandwich. H_2O.

FORCED INDUCTION ON FLAT TWINS.

Sir,—I should like to say a few words with regard to the letter which appeared in your issue of February 22nd.

The idea of your correspondent "C.L.V.C. 2872" is very attractive, but he should not place too much faith in the fact that the idea of a.o.i. valve in the piston head and crank case induction was used in the Gnome aero engine. He should realise that, being a rotary engine, the Gnome had of necessity crank case induction and also a.o.i.v. in the piston head. The latter has long since been given up, and, in fact, the engine is out of date for all practical purposes. The inlet valve was inaccessible, and the spring lost its temper. It also had the limitations in timing which are inherent in all a.o.i. valves. M.C.B. (R.F.C.)

Oxford.

OIL CONSUMPTION.

Sir,—I notice in *The Motor Cycle* for February 22nd an account of a 200 mile run on a 3 h.p. Enfield, in which the cost of the lubricating oil is put at 6d.

I should very much like to know what quantity was used; even at the cheapest rate of purchase it seems a very meagre amount.

Discussions on petrol consumption always seem of more interest than oil consumption; but as an aid to knowledge I should very much like to hear your readers' views on my oil consumption.

I ride regularly almost every week, solo, a non-stop run of 100 miles out and 100 back through average country. My average speed works out at about 31 m.p.h. (several towns are passed through), and I have ridden several different makes and types of machines, including 3½ h.p. single, 4-5 h.p. twin, and 2¾ h.p. flat twin (the last I found could not maintain the above average).

I use one quart of oil each 100 miles. Several riders have told me I am simply wasting oil; others—old and experienced hard riders—tell me to use "all that and more."

I have never experienced a sooted plug, have never once failed to arrive dead on time, and (though not speaking as an expert) have always had a nicely running engine, which only smoked occasionally, *i.e.*, accelerating in low gear.

I may say I use the best grade of oil and of proper body.

FOUR YEARS' RIDER.

[Engines of different power vary considerably in oil consumption, and the 3 h.p. Enfield twin should be a little more economical than others of equal power, by reason of the circulating oil system, which makes repeated use of the oil, whilst the actual loss is small. On the trip in question no definite record was kept, but a very fair estimate of the amount used is threequarters of a pint or a little less (approximately 2,300 m.p.g.), a rather low consumption it is true, probably due to it being an almost continuous top gear run at reasonable speed. The oil used was purchased in bulk some time ago at about 3s. 6d. per gallon, so that 6d. will cover the cost of lubrication for the run. "Four Years' Rider" is using a lot of oil at a quart for 100 miles, and it should be possible to cut this allowance down without detriment to his engine. The average speed mentioned is high, and may account for it to some extent.—ED.]

SILENT DISCHARGE.

Sir,—I notice in your issue of February 22nd that "Ixion" mentions once again my silent discharge theory.

I have, since writing the original article, been making some further experiments, which promise to be of considerable interest. I shall hope to obtain your permission to communicate them to your readers. Unfortunately, I have but little spare time, and so the experiments, which are numerous, will take some little while to complete.

At present they point to a different cause of the trouble—they do not confirm my theory—which is simpler than the one I suggested.

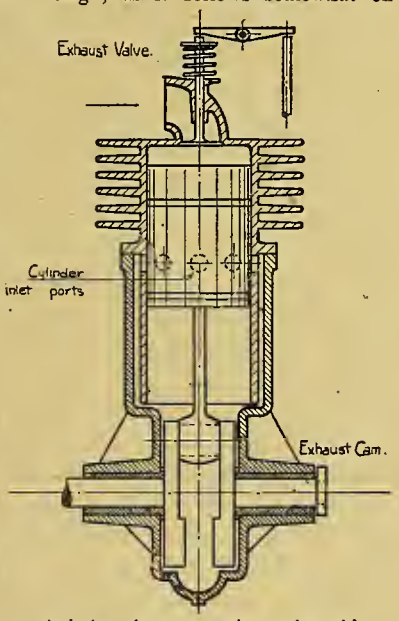
In the meantime, it would help me very much if any readers interested in the matter would *(a)* let me know what make of plug they have found satisfactory in overcoming the trouble; *(b)* let me have any notably defective plugs for testing purposes. I could not guarantee to return the plugs undamaged, as the method I am using in my experiments is one which involves considerable risk to them. If any of your readers would oblige me in this manner, it would very materially assist me in co-ordinating my results with those obtained under actual running conditions.

C. H. STEPHENSON.

[We hope to hear further from our correspondent; in the meantime, any communications sent c/o the Editor will be forwarded.—ED.]

PORT DESIGN ON TWO-STROKE ENGINES.

Sir,—I was interested in your correspondent A. H. Wilde's suggested port design, as it follows somewhat on the lines of a design I produced some four or five years ago, but lack of opportunity prevented me from testing out in practice.



A design of a two-stroke engine with overhead exhaust valve. (See F. E. Schofield's letter.)

The difference between your correspondent's design and mine is that I prefer the exhaust valve in the cylinder head, where it is in the best position for rapid cooling and also for preventing overheating of the cylinder walls and piston. Further, the annular inlet tends to maintain a more even temperature of the piston, and should prevent the annoying gumming up of the top piston ring. The cylinder casting is also more symmetrical and free from internal cores in the walls, which is conducive to better moulding and casting.

F. E. SCHOFIELD.

Sir,—I notice in your issue of February 22nd a letter from Mr. A. H. Wilde, in which he draws attention to what he terms a contradiction in my article on two-stroke engines. I still maintain that as a type two-strokes are apt to consume more petrol in proportion to their horse-power than four-stroke engines of the same cubic capacity.

Mr. Wilde gives 24% as the brake thermal efficiency of a good four-stroke engine, and 17% as the estimated brake thermal efficiency of two-strokes such as the Allon, the Radco, or the Connaught. While in no way doubting the accuracy of his 24%, I should personally have put the brake thermal efficiency of the above mentioned two-strokes at much higher than 17%. But in a matter of this nature, in which it is scarcely possible for average motor cyclists to be accurate to a digit or so, it must be a case of *quot homines, tot sententiæ*—a tag we have all learnt at school, and which we might well apply to some of the correspondence that appears in your journal.

Since Mr. Wilde has given us a description of one of the limits to "cutting away of the cylinder wall," I might mention another limit. Indiscriminate cutting away would mean that the exhaust port would be more thickly encrusted with carbon than at present. But when the exhaust port is increased by its present dimensions the cylinder would be subjected to no more distortion than is inseparable from any two-stroke engine, and the increased area of the piston exposed to the heat of the exhaust gases would give the lubricating oil scarcely any greater chance to form a carbon deposit.

I notice that "Excelsior's" statement concerning his Villiers two-stroke is criticised by "Ixion," and again in the issue of February 22nd by the rider of a Metro.

I am sure that many another motor cyclist interested in the present and the future of two-stroke engines awaits as eagerly as myself a further letter from "Excelsior."

I myself am exactly seventeen years old, and the motor cycle as a piece of compact mechanism excited my interest four years ago. I give this information in the hope that many other public school boys may take up the study of motor cycles as an instructive hobby. To the truly sporting motor cyclist the individualities of his machine mean as much as the rides to be obtained from it.

PROGRESSIVE.

SINGLE V. TWIN-CYLINDER ENGINES.

Sir,—The very interesting, but somewhat inconclusive, discussion on this subject seems to be mainly carried on by gentlemen experimenting with flat twins and gentlemen who have not yet started to do so.

I do not notice much from the original makers of the flat twin, Messrs. Douglas Bros., who have commercially made these engines, which are used on motor cycles, cars, stationary workshop outfits, and the travelling Marconi outfits for Army and Navy. Perhaps this firm, which has made and sold hundreds of thousands of these engines since 1908, feels that the wholesale manner in which other firms both in England and America are abandoning single cylinders and V twins in favour of the horizontally-opposed engine may give the public an impression that, despite all the theoretical objections that have been so ably put forward in your previous issues, there must be some reason why the private owner will buy the flat twin.

As a private owner, I should briefly like to give my reasons:

1. The engine is easily started and accelerates quickly.
2. The vibration is nil.
3. The upkeep as regards tyres and belts is much less per horse-power than any other motor cycle, one, two, or four-cylinder, that I have habitually ridden.

I would just like to say a word or two in elaboration of these three points.

1. That the engine is easily started I can prove by the fact that my 3½ h.p. with sidecar had the clutch and kick-starter mechanism put out of gear early in 1916, and was never used, and indeed a clutchless gear box was substituted at the works early this year. I started out at midnight recently to a night call, primed the cylinders, and went off from cold on B.P.2. Some easy starting!

2. No vibration, or rather engine vibration. No Douglas rider needs to be convinced that this is the case. I have repeatedly seen a Marconi outfit laid on the ground with the engine running at two or three thousand revolutions, while I have carried a 2¾ h.p. outfit used for wireless Government work round a workshop by the handle with the engine running.

3. The cost as regards tyres and belts. My 3½ h.p. sidecar outfit is under-tyred, as there is not sufficient clearance between the mudguard and tyre to run larger than 26in. × 2⅜in. Even then I average over 4,000 miles with 26in. × 2¼in. passenger Hutchinsons; while in 22,000 miles driving I have bought two new belts, ⅞in. diameter, to replace the one on the machine, and two Renold's chains, a new one of which I could do with but cannot obtain.

I ride the twin opposed because I am getting old, and it gives me comfort and ease. The boys, I believe, like it because they get comfort and speed. The matter is in a nutshell.

As you are well aware, I have no financial interest in any motor concern.

CHARLES S. PATTERSON, M.B., M.R.C.S.

Sir,—Capt. Lindsay must have misunderstood my remarks (issue December 28th, 1916). If he refers back he will see that I did not state that a long induction pipe, which gets cold, improves carburation. However, I firmly believe that a long induction pipe, properly heated, would be better than a short one with no room to heat it. I have not had the experience of freezing, though I have not even lagged the induction pipe, and run on pure paraffin, which, I should think, would be more susceptible to bad carburation when cold than petrol.

Mr. H. St. V. Addenbrooke has struck the worst fault of the flat twin, *i.e.*, the timing gear rattle; but I think this could be cured by having larger stems to valves and tappets and more accurately shaped cams. R.E.C.

London, S.W.

STARTING ON ACETYLENE.

Sir,—The danger of acetylene lies in the fact that it is spontaneously explosive at 30 lb. per square inch pressure. Motor cycle compressions are much higher. Because of this property, it is illegal to store acetylene at a greater pressure than 100in. of water (3.6 lb. per square inch). Acetylene has only been employed in internal combustion engines without accident where (1) compression was less than 30 lb., (2) a "clean" explosion was not obtained (as in the case of your correspondent who complained of excessive carbonisation), or (3) it was mixed with fuel of a lower calorific value. Acetylene will also form an explosive compound with copper unless the latter is kept greased, and for that reason iron fittings are commonly used in acetylene gas lighting installations. ROBT. S. BOSWELL.

Sir,—Your correspondent Mr. Lucas has attempted to hold my name up to ridicule, and to throw not merely doubt but contempt on any opinion I may hold with regard to the use of acetylene in internal combustion engines. He did so by taking a statement of mine that there is a legal prohibition against making a mixture of oxygen and acetylene, declaring that statement to be false, and proved to be false (according to Mr. Lucas), because of the use of oxy-acetylene blow flames in engineering and other applications. He further said that he had knowledge of hundreds of internal combustion engines running on acetylene in such places as country house lighting sets, etc., and that the explosion of acetylene with air is of the same sort as that of petrol vapour or other like hydro-carbons with air.

In a letter I wrote recently I challenged him to obtain proof of his point of view on the legal question, *re* mixture of oxygen and acetylene, and I showed that the oxy-acetylene blow-through jet does not cause a mixture, in any ordinary sense, of the two gases; further I expressed the opinion that if a "mixed jet" were ever employed it could only be so under expert care, and with special control valves.

I have spent a little time recently (1) at the offices of two different acetylene commercial concerns (names sent for Editor's information) and (2) at the Home Office making enquiries.

First, let me make it quite clear that my original statement as to prohibition of making a mixture of acetylene and oxygen was only intended to be a caution to experimenters that they will be dealing with a quite specially violent explosive. It had no other bearing, and could not be read in any other sense by any ordinarily reasonable person. The only reason I bring it up again is because Mr. Lucas, with considerable discourtesy, declared that the statement showed how little worthy of consideration were any opinions I might express; and as he appears to be secretary of a commercial acetylene concern, any reader would naturally think he ought at least to know the regulations covering his own special department.

Now, sir, when I called at the Home Office to make enquiries I was taken at first to the inevitable junior. He, however, quickly grasped what I wanted, noted it on a slip of paper, disappeared for about five or ten minutes, and then asked me to come to the room of one of the senior staff engaged on acetylene and other kindred matters; this senior ranks as colonel. I stated what I wished to know: "Is there a prohibition against making a mixture of acetylene and oxygen?" "Yes," he said, "there is."

"Can you give me definite references as to it?" I asked. He had them all ready, and read various long-winded paragraphs, and then, giving me a small printed sheet, he said, "It all comes to this. First acetylene in admixture with oxygen, air, or in certain other conditions, is declared to be an explosive, so as to bring it within the general operation of the Act. Next, acetylene in these conditions is deemed to be so dangerous an explosive that it must not be made, kept, or dealt with, and so on. There are certain exceptions," he went on, "and you will see what they are."

Now these exceptions are particularly interesting in the present circumstances to me, for right in front comes the blow-pipe flame, as said my informant, pointing to the "burner" clause, showing at once the correctness of my contention in last week's letter that the oxy-acetylene flame is not, in any ordinary sense of the word, an apparatus for making a mixture of oxygen and acetylene.

Perhaps even more interesting is it to note that the Home Office considers acetylene so dangerous a substance that the prohibition extends not merely to making mixtures of *oxygen* and acetylene, but also of *air* and acetylene, unless it is in some properly contrived apparatus for burning it at once. Could there be a fuller vindication of my caution to experimenters that they have to deal with an altogether different explosion from petrol?

Now as to my enquiries at the offices of commercial concerns. In the case of No. 1 I asked to see a responsible person who knew the regulations and uses as to acetylene. When he came he told me that he did not actually know of a single engine running on acetylene, and that, broadly speaking, he would consider it a decidedly dangerous practice. I asked him about the oxy-acetylene flame. He said that only "blow-through" jets are employed.

In the case of No. 2 concern, I was met at once by one who obviously had "acetylene" off by heart in all its branches. I asked him about engines. He did not actually know of a single one regularly using acetylene, though (in common with many more) he knew it has been the subject of experiment.

"You would call the practice of using acetylene in internal combustion engines to be in merely an experimental stage, then?" I asked.

"Most decidedly," he told me.

"What is the practice with the oxy-acetylene flame?" was my next question.

"Always a blow-through jet," he said.

"Never a mixed jet," I asked.

"If you can bring out a practical mixed jet," he said, "you will bring out a thing with a very big future."

"I suppose, because of the smaller amount of gas used and the possibility of a quite small flame?"

"Exactly," said my informant.

Now, sir, it is quite clear, if we accept the above, that even the small mixing chamber, which can be used with safety in the mixed oxy-hydrogen flame, is too full of danger in the case of oxygen and acetylene to be used, in spite of its other very great advantages.

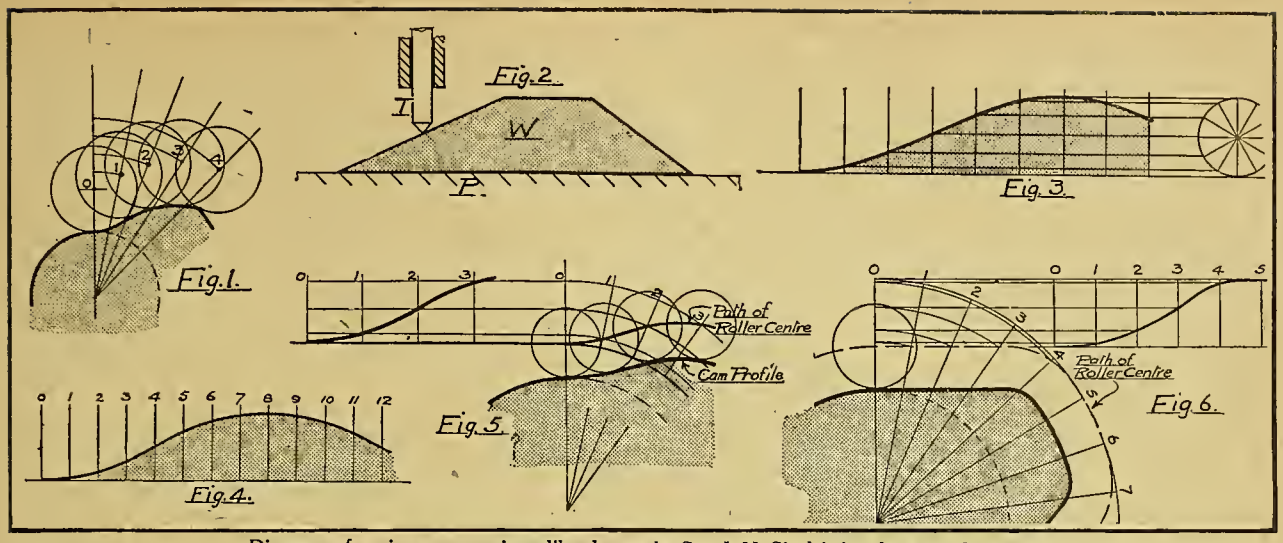
This absolutely disposes of Mr. Lucas's contention that the mixing of oxygen and acetylene is an industrial practice.

May I add one more point? Is Mr. Lucas's information *re* engines running on acetylene worth more than his information *re* the regulations of the use of acetylene? I do not at present directly call it in question, but I have seen so many country house lighting sets, and yet have never once come across an engine using acetylene; neither of my commercial informants has had better luck. Mr. Lucas spoke of "hundreds" of such engines. Can he write down one-half of one hundred? Even fifty engines which could be seen would be of very great interest to me, for I think that one could form a very fairly correct opinion as to how far experiment has reached with such a list as one's guide. It is, I suppose, hardly possible that Mr. Lucas includes in his "hundreds" certain small engines (generally running on petrol) used as accessories in acetylene gas lighting plants.

In conclusion, I do not think that any gentleman who had so aggressively attacked me, as Mr. Lucas did, will be quite content, on reading this, to leave matters without some sort of expression of regret.

I am afraid I have occupied a lot of your space, sir, but, at any rate, I have taken the trouble to clear some ground for experimenters; and to all such, who go along truly scientific lines, I say, "Here's luck." And if acetylene is is at present dangerous when merely adapted to engines not designed for it, may the time soon come when we can turn on our lamp, press a button, and glide away on the clutch!

F. C. LEES, M.A. Oxon.



Diagrams of various cam motions dilated upon by Sgt. J. H. Sinclair in a letter on this page.

CAM DESIGN.

Sir,—In the interesting article on cam design in your issue of February 1st, a mistake has been made in the diagrams showing how the cam profiles are obtained to suit any particular kind of motion. Referring to fig. 1, if 0, 1, 2 are points on the path of the roller centre as it rolls around the cam, the cam profile is the curve touching the roller circles described with 0, 1, 2 as centres. Comparing this figure with fig. 4 in the article by "A.A.S.," it will be seen that in his case the roller cuts into the cam, which is obviously wrong.

The motion produced by a cam can best be studied by drawing what may be described as the "equivalent wedge." Let T (fig. 2) be a sharp-pointed tappet, which is moved upwards and allowed to fall downwards by the wedge W as it slides along the plane surface P. Then the motion of T will obviously depend upon the shape of the wedge W. Assuming W to move along with uniform speed, then the tappet will move upwards and downwards with uniform speed if W has straight sides, as shown in fig. 2. This sort of motion is unsuitable for cams, for reasons pointed out by "A.A.S." Something more gradual in pick up and slow down is required, such as is shown in fig. 3, which illustrates a wedge which will give simple harmonic motion and also the method of getting its shape. Fig. 4 is the wedge for uniform acceleration and retardation. The heights of the various ordinates 0 to 4 are as their (position)^2 Thus if 1 is $\frac{1}{16}$in. high, 2 is $\frac{1}{16}$in. $\times 2^2$, that is $\frac{4}{16}$in. high; 3 is $\frac{1}{16}\times 3^2$, that is $\frac{9}{16}$in. high; 4 is 1in. high. From 4 to 8 the curve is similar to that from 0 to 4, but reversed.

To get the cam shape which will give any one of these motions, the corresponding wedge simply has to be wrapped around a circle, as shown in fig. 5. The curve obtained first is the path of the roller centre, as this is a convenient point to which the motion can be referred. The cam profile can then be obtained by describing a number of roller circles and drawing the curve touching them.

As "A.A.S." points out, many "tangential cams" are made because of their ease of manufacture. This is only permissible if this type of cam gives a smooth motion. Fig. 6 shows a tangential exhaust valve cam and the wedge equivalent to it; it will be seen that the pick up is all that can be desired. The slow down is rather quick, indicating that this particular cam would be improved by rounding off the corners a little more.

J. H. SINCLAIR, Sgt. M.M.G.S.
B.E.F., France.

MUD—WHAT IS ITS PROPER PLACE?

Sir,—May I join in your appeal to manufacturers to pay more attention to the important subject of mudguarding? I do not think there is much to choose between any of the modern machines I have had in this respect—they are all equally bad. I can remember riding a motor cycle in the thousand miles trials of 1903 through some of the worst weather on record, and I do not think that I succeeded in collecting anything like the amount of mud on my clothes during the whole of that period that I can accumulate during a run of fifty miles in bad weather to-day. Granted, of course, that the machine of to-day moves faster, still there has not been anything like the improvement in the mudguarding of machines that has occurred with engines and other details, and that is why I suggest that manufacturers should cease arguing about long and short strokes, flat twins, and the like, and pay a little attention to making the machine more comfortable to use.

Apart from the tendency to adhere slavishly to push bicycle ideas, where is the necessity for the mudguards always following the exact contour of the wheel? A recent experience with mudguards which persistently clogged after a slight fall of snow has convinced me that the idea is altogether wrong; in fact, they are a standing reproach to all concerned in their design, manufacture, sale, and use. If I were a motor cycle manufacturer I would set to and rig up some device in my works whereby the wheels of a machine are caused to revolve at various speeds in a bath of mud, in order in the first place to see where the mud went to. Next I would direct a blast of air of good volume on to the front of the machine to imitate the effect of the vehicle travelling, and also, as far as possible, the suction created by its passage through the air. Then I would try various forms of guards until I arrived at something which stopped the mud better than what we have at present. Then I would take the machine on the road to study the distribution of mud splashed up from the road by the impact of the wheels in the puddles.

The idea of the mudguards on all the machines I have used up to now seems to be that they shall collect the mud which is thrown off the tyre, and then carefully drip it on to other revolving parts, such as the brake rim, belt, etc., whence it can be nicely distributed over the machine and rider.

I trust that your readers will join in this crusade for better mudguards, and not wait until someone sends a properly guarded machine over from America or somewhere to arouse our manufacturers to the necessity for action in this very important matter.

D. ELYARD BROWN.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—I was rather amused at the letter of Mr. M. Hitchcock in your issue of the 8th inst. on the subject of driving licences. I have been a motorist for eleven years now and have quite failed to notice the awful fact that—to quote Mr. Hitchcock's words—"a good 75% of motor cycle and car drivers should not be granted licences at all."

I take it that your correspondent belongs to the immaculate 25%, and, of course, the great majority of us poor benighted souls who have read his effusion belong to the

bold, bad 75%. I think that Mr. Hitchcock would find if he examined 100 licences that he would not see anything like 75% endorsed, and any motorist knows that the average policeman does not love a motorist, and that he loses no opportunity to make trouble for anyone indulging in any known or unknown brand of bad driving. Why only £5 fine for omission to blow one's horn every fifty yards? Why not do the job properly and hand out a life sentence? Instead of writing such a letter, I think Mr. Hitchcock would have been better employed in inventing a mechanical horn to blow every ten yards.

In his beautiful argument of the runaway horse, why does he assume that a deaf rider necessarily rides in the middle of the road? Does his deafness prevent him from riding on the correct side?

Does Mr. Hitchcock seriously suggest that a person who is near-sighted or "partly deaf" should be refused a licence? Does he suggest, for instance, that your correspondent "M.C.S.," who has bled and suffered for his country, should be debarred the health-giving pleasure of motoring? As regards an examination for eyesight, hearing, and general intelligence, and judging by the general tone of Mr. Hitchcock's letter, I have serious doubts as to his ability to pass all three tests. I think your readers will have no doubt as to which test would "stump" him.

In conclusion, I have only to add that I am not the slightest bit blind or deaf, and have not had my licence endorsed, therefore these lines are not penned through any personal feeling in the matter.

Would Mr. Hitchcock oblige by telling me where I can see a motor cyclist drive "full speed" into a main road from a cross road? Such a sight should be worth seeing. I wonder what Mr. Hitchcock means by "full speed"?

R. E. DAIN LAWSON.

Sir,—Your correspondent, Mr. A. L. Gray, writing—rather unfeelingly—in *The Motor Cycle* of February 15th, in reply to "M.C.S.," allows his own theory to become confused with that which has still to be proved in practice.

One cannot establish a rule upon a special case, and beyond that there is no proof as to a one-eyed man's capacity for judging distance. To close one's own eye as an experiment is no test, because one is not used to the sensation.

As I also possess two eyes, I am in no better position to judge; but the fact that in sketching one almost invariably closes one eye for the purpose of judging distance is worth remembering.

If such regulations are embarked upon where are we going to stop? Surely a clear-visioned one-eyed man is not going to be deprived of that which a short-sighted man can enjoy. It is the reckless and self-confident motorist who is the danger, not the one who is fully conscious of his limitations.

MAURICE J. HELLIER (Lt.).

WHAT IS A SPRING FRAME?

Sir,—Your article on spring saddle-pillars was interesting, but, in my opinion, the fitting of a spring saddle-pillar is an insult to the makers of the saddle fitted, and only a make-shift at best.

I think it is about time that some proper definition of a "spring frame" was established by the motor press.

Devices that only protect the rider from road shock, as do the above mentioned saddle-pillars, and the so-called spring frames such as the "B.A.T." or "Edmund," hardly come within the definition of a true spring frame.

I suggest the following as a good definition of a spring frame: "A bicycle in which everything 'fore and aft,' including engine, tank, etc., is insulated from road shocks by means of springs." C. W. PIDCOCK.

BEARING PRESSURES AND LENGTH OF STROKE.

Sir,—With regard to the discussion in your columns on the subject of long *v.* short stroke engines, I am afraid that I am not in a position to go deeply into this question, from a scientific standpoint; but, in common, probably, with a large number of your readers, I judge by results; and having owned and driven several modern machines, both long and short stroke, I must say that I have always found the long stroke engine much pleasanter to drive, more powerful, and cooler running.

Your correspondent's suggestion ("H.K.P.," February 1st), that a Norton would go as well with any other bore and stroke, opens up new possibilities. Perhaps, if only one knew, Mr. Norton has already found this out; and one suspects, therefore, that this apparently guileless old gentleman advocates the long stroke principle simply with the idea of throwing other manufacturers off the scent, and preventing them from examining his engine too closely to find out where the power really does come from. Referring to Mr. Norton's article in a recent issue, it seems to me that this article is wrongly headed, as Mr. Norton does not appear to be discussing so much the advantages of long *v.* short stroke as the question of bearing pressures pure and simple. It is worthy to note, in passing, that some of the most successful motor car engines have a very much longer stroke in relation to the bore than any long stroke motor cycle engine, even the Rudge; and looking at the matter from a purely commonsense point of view, it would appear that car designers prefer to take advantage of the unquestionably higher thermal efficiency of the long stroke engine, and balance any extra stresses there may be by designing their bearings accordingly. D. ELYARD BROWN.

A HOT SIDE?

Sir,—With reference to the correspondence which has taken place on the subject of unequal distribution of heat in the walls of an air-cooled engine, I fancy that the results of some tests made under my direction on an A.B.C. engine about two months ago might prove of interest. The tests were made on a stationary set in which a standard 500 c.c. engine drives a small dynamo. The brake horse-power exerted by the engine was 4.1, and the speed 2,500 r.p.m., this being kept constant by a centrifugal governor operating on the throttle. Cooling was provided by fan blades attached to the flywheel, which directed a draught mainly on the side of the cylinders remote from the exhaust valves.

The temperatures were obtained by thermo-couples screwed under the nuts which secure the cylinder heads to the walls, one of these being under a nut close to the fan and the other on the opposite side close to the exhaust valve. These points were chosen as representing approximately the hottest part of the engine, and it may be noted that, owing to the intimate contact with the studs, the results obtained represent practically the temperature of the internal wall of the cylinder. The temperatures at the tops of the fins were not measured, but were certainly very considerably lower, it being possible to bear one's hand on the cylinder fins for a short time while the engine was running. The results were as follow:

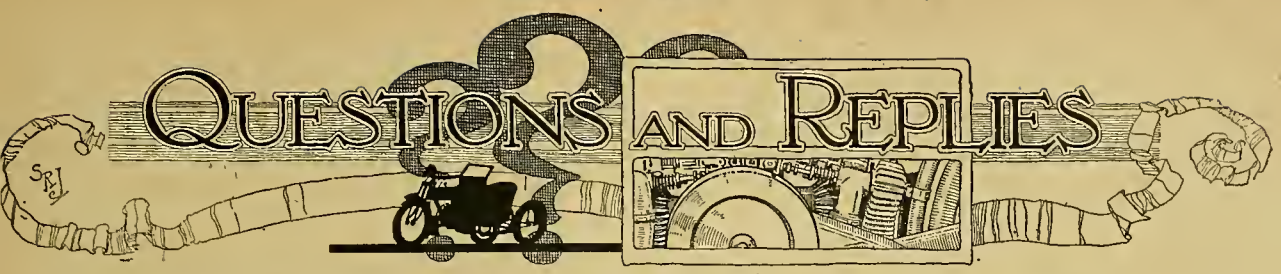
Time. Hrs.	Temp. (1). Fahr. deg.	Temp. (2). Fahr. deg.	Air Temp. Fahr. deg.
0	—	—	40
¼	219	249	47
½	217	250	53
1	219	252	60
2	221	254	60
3	221	256	60
4	221	256	60
5	221	258	60
After shutting down 2m.	298	not taken	

The engine speed corresponds to running a bicycle at 43 m.p.h. on a gear of 4½ to 1, while the power developed is about 50% more than the average required for this speed on the road. While, therefore, the cooling due to the fan was probably a little more effective than that obtained under road conditions, I am convinced that a four hours' run on the road at an average 43 m.p.h. would certainly not produce any higher temperatures on account of the less average load. The engine was well within its power capacity throughout the whole test, and was not subject to any hand adjustments from start to finish.

The temperatures are astonishingly low, and their approximate value was confirmed by attempting to melt a low temperature solder on various parts of the cylinder head. The results also show that the divergence in temperature between different parts of the engine is negligible.

No special tuning was undertaken on this engine, the set being merely one taken at random from a large number which were being tested at the same time.

I have no interest in the A.B.C. engine, but have had a very large experience of these engines on stationary sets, and give the above information as it may be useful in showing the value of the cooling arrangements on this particular design of engine. LEONARD MURPHY, M.I.E.E.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C., and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Using a Twin Magneto for a Single Cylinder.

I have a twin magneto, and I want to use it for a single-cylinder engine. Can I do this without injuring it, and shall I have to take anything out of it? —S.A.

If you remove one of the carbon brushes and the corresponding cam the magneto will work quite satisfactorily with a single-cylinder engine.

Petrol Substitutes and Starting.

I should be much obliged if you would answer the following questions. My machine is a 2¾ h.p. Douglas, and the carburetter (Amac) has warming attachment from exhaust. (1.) Could I run on pure petrol substitute? (2.) If I fitted the Binks carburetter, could I run and start up equally well on any fuel besides the Binks fuel?—C.H.G.

1.) Yes, if you start first of all with petrol or inject petrol into the cylinders. 2.) The Binks carburetter is suitable for any fuel, but you can only start on lighter spirits, such as benzene, petrol, ether, or acetylene gas.

Timing an Engine.

Would you be kind enough to describe to me (1) the process of retiming a single-cylinder? (2.) If the magneto went wrong, what parts would you advise me to attend to myself?—W.P.

1.) The engine should be timed in the following manner: *Valves.*—Set the exhaust valve to close just after the completion of the exhaust stroke. It will then commence to open when the piston is about one-seventh of the length of the stroke from the bottom of the firing stroke. The inlet should commence to open as the exhaust closes, and remain open for about one complete stroke of the piston, or while the flywheels turn through 190°. *Magneto.*—Place the piston exactly on top of the compression stroke, and connect up the magneto with the points just about to break and the ignition lever two-thirds retarded. This will mean that the explosion, when the ignition is fully retarded, will take place when the piston has travelled about .5 mm. down the firing stroke. (2.) You may adjust the platinum points when this is necessary, clean the carbon brushes and slip ring, and see that all the terminals are tight, but you cannot interfere with such points as the armature winding and the condenser, which are beyond the powers of an ordinary amateur.

Uneven Firing.

I have recently bought a Royal Enfield fixed-gear 2¾ h.p. twin, which according to registration transfer is a 1911 model. I am also told it is a Motosacoche engine. I have just lately been troubled with misfiring on back cylinder, which only occurs when running slowly, and always when I move the throttle open, and occasionally on slightly closing it. Whenever I accelerate it seems to choke the back cylinder, in spite of careful opening. The front cylinder fires well at all speeds and throttle positions. I notice the compression on the back cylinder is greater than on the front, and yet, strange to say, it does not fire so well. I have tried various plugs, with no improvement. Incidentally, I never require to retard the ignition, as it starts and runs best fully advanced. Should this be the case? If not, how shall I remedy it?—W.P.S.

We should think that the misfiring is due to some small maladjustment, possibly an unsuitable plug. Use one of good make, and preferably with single-gap electrodes. The gap at the points should be fairly large, say 1/32in.; a small gap will often cause missing. See that your valve springs are strong enough, especially the exhaust, and that the valves are closing properly. There should be about .4 mm. clearance between the valve stems and tappets. See that no air leaks exist in the induction pipe joints. It is quite usual for the magneto to require to be fully advanced all the time, but with your particular make of machine it is possible for the driving mechanism to become worn, so causing the magneto to become retarded. If this has occurred, the wear should be taken up by means of suitable packing.

"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

Trial Runs and Licences.

I possess a 3½ h.p. motor cycle, the licence of which expired on December 31st, 1916. As I anticipate selling the machine, I did not want to renew the licence. In the event of my negotiating with a probable buyer who *may not* have a motor cycle licence, and he rode the machine, could the authorities serve a summons on him or on me? Of course, I suppose I am liable if I ride the machine myself, but could they make a case of it if I merely wheeled the machine to any particular place for the purpose of a trial? I still hold a driver's licence, and I realise the probable buyer must hold one also before he rides.—P.C.R.

In the case of anyone to whom you sold your machine driving the said machine without a licence he would clearly be liable, and not you. You would only be liable if you actually rode or drove the machine; wheeling it about is not driving it. If no sale were effected, you would become liable for a licence, which must be taken out within twenty-one days.

Engine Running Hot.

My machine is a 1914 single-geared T.T. model, used in conjunction with a sporting sidecar. Every 200-250 miles I have to remove, from under the piston, carbon which is sometimes ⅜in. thick, the combustion space and top of piston being absolutely clean. I have tried all the following without a vestige of success: 1. Carburetter—I have tried various jets, petrol levels, etc. 2. I have lowered the compression nearly ⅛in. 3. I have tried different valve and ignition settings. 4. I have mixed oil with the petrol, and lubricate with Castrol. 5. Have tried various plugs. Do you think a B.S.A. carburetter would make the engine run cooler? It is the hottest running engine I have ever sampled. I have tried many. Over and under-oiling with various oils make no difference.—G.H.

The trouble is probably due to the fact that the machine is single-geared, and it is exactly what one would expect when using a single-geared machine in conjunction with a sidecar. If you had a lower gear to fall back to when the engine started knocking the trouble would be obviated to a very large extent. All you can do now, provided you cannot fit a two-speed gear, is to run with quite a low top gear, drive the machine at an easy pace, and only open the throttle when absolutely necessary.

Sparking at Contact Breaker.

I shall be greatly obliged if you can help me with the following trouble I am experiencing with my two-stroke motor cycle. (1.) A spark occurs across the points in the magneto (or rather contact breaker), and this I cannot stop. I have cleaned and adjusted the points to .4 mm., but it still continues. The machine is very difficult to start, but once started it is all right, although it is sparking in the contact breaker. Is this the cause of the difficulty in starting? There are no air leaks, and the plug is A1, also the carburetter. (2.) Why has petrol to be vaporised (or why is it vaporised) before entering the cylinder? It fires all right when petrol is injected through the release valve.—P.N.

(1.) The cause of the sparking at the contact breaker may be due to the fact that the condenser connections have broken down or are poor. Do not forget that in some magnetos the condenser connection is through the contact breaker cover. If you remove the cover when the machine is running there is excessive sparking at the contact breaker points. The difficulty in starting is probably due to the cold weather, accentuated by the bad quality of petrol now being sold. (2.) Petrol fires when injected because it evaporates. The better the vaporisation you get the more economical is your engine because you are only burning the petrol vapour, and so do not waste the liquid fuel, only a part of which is consumed.

Carburetter Adjustment.

I should be obliged if you will answer the following queries. My machine is a 1915 B.R.S. Norton, with B. and B. carburetter (pilot jet and needle-controlled main jet): (1.) I find that the pilot jet gives an easy start from cold, but gives bad slow running, and requires the extra air lever to be fully open when running. Would this be due to faulty adjustment of the needle, or is the pilot merely to be used for starting? (2.) Should I set the needle so that the extra air is kept closed all the time in cold weather? At present the engine takes an equal amount of extra air and throttle opening when running on the level.—F.P.S.

(1.) You do not say whether your carburetter is fitted simply with an easy starting jet, which has a small lever to put the jet out of action once a start has been made, or whether it is one which has an adjustable pilot jet. The former is the type usually fitted to single-cylinder machines. The jet is used only for starting, and when once the engine is running it should be turned into the off position and the speed controlled by means of the throttle only. Twins are usually fitted with the adjustable pilot jet, which is always in action, and provided in order to give even firing at slow speeds. If this type is used the pilot should be adjusted so as to give even firing at slow speeds when the main throttle is shut right off. Your trouble indicates too strong a mixture, either due to too large a pilot jet, failing to shut off the easy starting jet, or to the needle in the main jet being adjusted up too high. (2.) You should be able to give a certain amount of air at all times of the year, but with this carburetter the air is automatically controlled by the opening and closing of the throttle; thus, the extra air should not have to be placed fully open except at very high speeds. In order to be sure that you are able to get a sufficiently rich mixture for slow speeds the needle in the jet should be so adjusted that when once the engine is started a certain amount of extra air is required. We would advise you to write to the makers for a booklet on the subject of adjustment.

Position of the Sparking Plug.

Would you tell me whether the sparking plug should be over the exhaust or inlet valve on a "twin"? I have heard several opinions on the subject, but cannot rely on any.—E.H.

The sparking plug on any sort of motor bicycle engine, single or multi-cylinder, should be over the inlet valve, when it is placed in a valve cap. When the inlet valve is overhead the sparking plug is generally in a special pocket.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

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READERS' REPLIES.

Butt Ended Troubles.

I have had the same trouble with butt ends as mentioned in *The Motor Cycle*, page 149, and have adopted the following tip. As a rule the butt leaks at the seam either side. What I have done is to cover the tube with thin rubber patching. Be sure the seam is covered for about one inch from the ends. Use plenty of French chalk on replacing. Tubes thus treated have been in for six months without any softening.—E. R. RISIEN.

Stopping a Blow-hole.

"W.W." (page 148) can quite easily stop the blow-hole in the aluminium crank case of his Scott with a little aluminium solder. Last year I helped to repair a flaw and crack in a friend's Scott machine. The damage was near the crank case opening, and allowed the oil to escape and the compression to be spoilt. Scrape the hole clean, and perhaps enlarge its outer end. Cut a piece of solder about the right size and lay it in the hole. With a blow-lamp make it all hot, and at the same time rub with a hot soldering iron until it adheres. No flux required.—E. J. COPE.

Tuning a Scott.

With reference to "G.G.'s" letter concerning a 3¾ h.p. Scott (*The Motor Cycle*, February 1st), I do not remember seeing any reference made to the exhaust ports being clear of carbon. Should these be choked, their restricted area would prevent the burnt gases escaping and reduce the incoming charge and also dilute it, thus causing all the symptoms of which "G.G." complains. This appears to be a very obvious remedy, but I have met many Scott owners who have overlooked this point when cleaning the engine.—C. F. BAKER (1910-1912 Scott).

Recommended Routes.

In *The Motor Cycle* of February 8th, you give a route—Dover to Wolverhampton—*via* Ongar, Harlow, Hertford, etc. I have been into Kent and back *via* Tilbury several times, but only once *via* Ware and Harlow. That piece of road, Hertford to Ongar, or *vice versa*, may look very well on a map, but one has to traverse this section to realise what a nightmare it is. There are several level crossings, and the signposts are very local in their direction, and, further, the road is in places narrow, rough, and very sinuous—eternally twisting and turning. The best route (with excellent surface) that I have discovered so far is Ongar, through Epping to Wake Arms Hotel; here turn right for Waltham Abbey, Waltham Cross. At Waltham Cross turn right again, straight through Cheshunt on the main road to Cambridge, turning left at a signpost a few miles from the Cross for Hertford. I believe this is a trifle longer than the Harlow route, but you have good straight main roads, and you travel right through Epping Forest, which at almost any time is pleasant. If I remember correctly, the distance from St. Albans to Tilbury (*via* Epping) is about fifty-four miles.—POWLAND S. SALT.

RECOMMENDED ROUTES.

WOLVERHAMPTON TO CARDIFF.—R.E.J.

Wolverhampton, Kidderminster, Worcester, Malvern, Ledbury, Ross, Monmouth, Usk, Newport, Cardiff.

BLACKPOOL TO GRIMSBY.—J.E.W.

Blackpool, Lytham, Preston, Clitheroe, Gisburn, Skipton, Ilkley, Otley, Tadcaster, Selby, Howden, North and South Cave, Hull, New Holland, Ulceby, Laceby, Grimsby.

GREAT DUNMOW TO BIRMINGHAM.—A.J.

Great Dunmow, Bishop's Stortford, Hertford, Hatfield, St. Albans, Hockliffe, Stony Stratford, Towcester, Daventry, Dunchurch, Coventry, Stonebridge, Birmingham.

BIRMINGHAM TO PORTSMOUTH.—H.P.D.

Birmingham, Hockley Heath, Henley-in-Arden, Stratford-on-Avon, Shipston-on-Stour, Long Compton, Enstone, Oxford, Abingdon, Newbury, Whitchurch, Winchester, Bishop's Waltham, Fareham, Gosport, by ferry to Portsmouth.

LEYTON TO EXETER.—H.W.P.

Leyton, Hampstead, Willesden, Ealing, Hanwell, Hounslow, Colnbrook, Slough, Maidenhead, Reading, Newbury, Hungerford, Marlborough, Chippenham, Box, Bath, Bristol (up Park Street), Clifton (Suspension Bridge), Abbots Leigh, Flax Bourton, Congresbury, Stock Lane, Churchill, Cross, Highbridge, Bridgwater, Tamlin, Wellington, Cullompton, Exeter.

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C. C. Wakefield & Co.'s mileage Lubrication Test using Fuel Mixtures and Castrol "C" (Summer) is now completed.

2,500 MILES, with the proportion of three gallons of Petrol to two of Paraffin, has been run upon two gallons of Castrol "C" (Summer grade), and the lubricating properties of the oil are not yet destroyed.

The engine (Shelsley Crossley car) remains in first-class running order, the piston heads and the bearings being in perfect condition. The Carbon deposit on the piston heads is particularly small.

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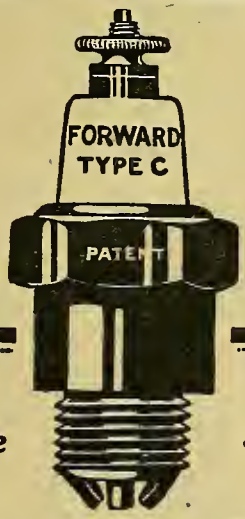

Price *3/6*

The heart of the Engine

—the plug, of course! —
Then how vitally needful that that heart be sound! Instal the robust and regular

FORWARD C

and enjoy the benefit of increased power, marked economy, and freedom from anxiety, always.

Speak to your dealer about it.

FORWARD MOTOR COMPANY,
35, Forward Works, Summer Row, BIRMINGHAM.

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BOWDEN Wire, Limited, being wholly engaged upon production for the British and Allied Governments, are unable to execute any orders for private purposes until further notice. They have in stock certain goods suitable for replacements. Customers are invited to state their requirements in this respect, and, if possible, these will be met

VICTORIA ROAD, WILLESDEN JUNCTION, N.W.

Godbolds

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All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.), by the first post on Friday morning previous to the day of issue.

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The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

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Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged, when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

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MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [X7098

A.J.S., 2¾h.p., 3-speed latest model, in stock.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [X7099

A.J.S. 4h.p. Combination, direct from makers.—W. Brandish, Triumph Garage, Foleshill Rd., Coventry. [X5986

A.J.S., 1913, 2¾h.p., 2 speeds, chain driven, in nice order; £23.—Percy and Co., 337, Euston Rd., London. [9045

ONE 1916 4h.p. A.J.S. Combination, detachable wheels, as A.J.S. 1916 list, fitted with Lucas horn, Lucas head and back lamps and generator, Stewart speedometer, sidecar fitted with wind screen, storm apron, Lucas sidecar lamp and generator, spare wheel attached to sidecar, large kit of tools, tyres in good condition, mechanically perfect; price £90.—Mould, Lichfield Rd., Rushall, Walsall. [X7085

Alldays.

1917 Allon, 2-speed, in stock.—Pickering, Mardol, Shrewsbury. [X6779

ALLONS, 1917 models, earliest delivery.—W. P. Edwards, Taunton. [X7078

1915 Allon, 2¾h.p., 2-speed, E.I.C., Senspray; 25 gns.—Railway Garage, Staines. [8856

NO FIRM LIKE

GODFREY'S

FOR NEW MODELS, GUARANTEED SECOND-HAND MACHINES, EXCHANGES, EASY TERMS.

WRITE FOR FULL LISTS.

GODFREY'S LTD.,

208, GT. PORTLAND ST.,

'PHONE: 7091 MAYFAIR. (2 lines.)

LONDON, W.

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Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

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MOTOR CYCLES FOR SALE.

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

ALLON.—All 1917 models in stock, 36-45 gns.; exchanges and deferred payments arranged.—Maudes', 100 and 136 Gt. Portland St., London, W. Tel.: 552 Mayfair. [7387

ALLON 1916½, 2-speed, painted mauve, new oversize tyres on both wheels, special mudshield, Brampton front forks, all tools, guaranteed throughout; price £31. —Moir, Torrington House, East Molesey. [X7143

1915 Countershaft Alldays, 4h.p., 3-speed, clutch, with smart coachbuilt sidecar, and complete equipment, serviceable outfit, excellent condition throughout; bargain, 49 gns.; exchanges.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [9052

Ariel.

RIDER TROWARD'S, 78, High St., Hampstead.—Ariel, 1913, variable gear, overhauled; 18 gns. [8997

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

1917 Ariels; immediate delivery of 5-6h.p. and 3½ h.p. solo or combinations, for cash, extended payments, or war loan stocks.—Jones, Garage, Broadway, Muswell Hill. [8765

ARIEL, the reliable motor cycle, 3½h.p. single, and 5-6h.p. twin models; delivery from stock.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0889

3½h.p. Ariel, 1914, 3-speed Armstrong, just returned from works, engine and gear overhauled, wheels and frame re-enamelled, almost as new; £36, lowest.—13, Stourbridge Rd., Lye, Worcestershire. [X7055

ARIEL, 3½h.p., with 5-speed gear, by variable pulley, a thoroughly genuine machine with an exceedingly fine engine, at the bargain price of £20, worth much more.—Layton's Garage, Bicester, Oxon. [9031

ARIEL Combination, late 1914, 3½h.p., 3-speed countershaft, little used, perfect condition, bargain, £50; also 1912 model, variable gear, in fine order and reliable, £25; good high power combination wanted. —Campbells' Garage, Golspie. [X7049

Arno.

ARNO, 2½h.p., Bosch, Druids, stand, carrier, 2nd Grade gear, in first-class order and condition; £20. —Maxim, 31, Hainthorpe Rd., West Norwood. [0894

ARNO, 3½h.p., 3-speed, clutch, Sturmey-Archer, not run 10 miles after overhaul and re-enamelling at cost of £8; reason for sale, officer ordered out; £23.—Box 758, c/o *The Motor Cycle*. [X7091

Auto-Wheels.

AUTO-WHEEL, in good running order; £5.—G., 74, Vernon Rd., Leytonstone. [X7113

TWO Genuine First-class Auto-Wheels, complete, little used; £8/10 and £10.—Murray's, 37a, Charles St., Hatton Garden, Holborn. [7137

AUTO-WHEEL, B.S.A. model, 12 gns.; also 1914 standard, £7/10; deferred terms if desired.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8881

Bat.

1914-15 Bat-Jap, 4-5h.p. sporting twin, countershaft 2-speed, T.T. bars, knee-pads, lamps, and horn; £38/10; exchanges; pay cash for combination.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [9053

MOTOR CYCLES FOR SALE.

Blackburne.

PETROL Free with 1912 T.T. Blackburne; 19 gns.—Rider Troward's, 78, High St., Hampstead. [8988

Bradbury.

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage; £49/10.—Motor Exchange, Horton St., Halifax. [8887

BRADBURY 3½h.p. Combination, 1912, N.S.U. 2-speed gear, new tyres; £30.—190, Broadway, Hendon, N.W. [X7091

BRADBURY, 4h.p., and Watsonian sidecar; a bargain, £12.—Crawford's Garage, Milkwood Rd., Loughborough Junction. [8999

1914 6h.p. Bradbury Coachbuilt Combination, countershaft 3-speed gear, kick starter, speedometer, Lucas lamps, etc.; sacrifice £48.—Twinn, 285, High St., Brentford. [8829

WAR Bargain.—4h.p. Bradbury, 1914, used very little, 2 speeds, lamps, etc., etc., 1915 £14/14 coachbuilt torpedo sidecar; accept £34 quick sale.—Pte. Millard, M/205777, Section 2, Eildon Billet, Catford. [X6993

Brough.

BROUGH, 4h.p., opposed twin, 2-speed, 1915, fast, almost new; 47 gns.—245, Hammersmith Rd., London, W. [8968

BROUGH 3½h.p. Twin, 3 speeds, kick starter, lamp set, mechanical horn, speedometer, rear light, done 843 miles, absolutely as new; £60.—Martin Walter, Folkestone. [8861

Brown.

3½h.p. Brown, F.E., fair condition; £12, lowest; deposit, approval.—E. Porter, Scredington, Lincs. [X7035

1914 3½h.p. Brown and Millford sidecar, 2-speed Bowden gear, kick start, complete, all spares (including waterproof), for instant use; any trial; no personal offer refused; will guarantee satisfaction.—J.F.A., Felix Villa, Tonbridge, Kent. [X6957

B.S.A.

B.S.A., 1917 models H and K, with sidecars, in stock.—Moss, Wem. [X7128

1917 B.S.A., chain drive; in stock.—Pickering, Mardol, Shrewsbury. [X6775

COLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A., new Model KS, from stock; trade supplied; terms on application.—Wauchope's, 9, Shoe Lane, London. [8952

1916 Model K B.S.A., splendid condition, fully equipped; £55, or offer.—A. Coffin, Holwell, Sherborne. [X7074

B.S.A. Model K, 1916½, and sidecar, splendid condition: £68, or nearest; buying car.—7, Kymberley Rd., Harrow. [8979

4½h.p. B.S.A. Combination, 1915, 3-speed, kick, speedometer, perfect condition; £57/10.—133, Archway Rd., Highgate. [9019

B.S.A., 3½h.p., 1912, clutch model. Dunlops, 1915 B. and B., Bosch, recently overhauled; what offers? —225, Dudley Rd., Wolverhampton. [X7083

1914 (late) B.S.A., 3-speed, with Canoelet sidecar, with screen and apron, all spares, complete, as new; £60.—Box L3,232, c/o *The Motor Cycle*. [8906

B.S.A., 4½h.p., 1916, chain drive, countershaft 3-speed, clutch, kick starter, lamps, horn, in tip-top condition; £53.—90, Bloomfield Rd., Woolwich. [8925

1917 B.S.A.'s, Models H and K actually in stock; cash, exchanges, extended payments, or war loan stocks.—Jones, Garage, Broadway, Muswell Hill. [8767

B.S.A., 4½h.p., 1914, chain drive, 3-speed, Cowey, Lucas lamp, new tyres, and 10 gn. Montgomery wicker sidecar; cost £83, sacrifice £43. 34, Ellerton Rd., Sheffield. [9022

1915 B.S.A., 4½h.p., chain-cum-belt, 3-speed, special coachbuilt sidecar on Paragon chassis, under 1,500 miles, spare tyre, tube, belt, etc.; £56.—Grover, 31, Winchester St., Basingstoke. [X6967

1916 (late) 4½h.p. B.S.A., countershaft 3-speed, chain-cum-belt, Watsonian coachbuilt Aero sidecar, condition as new, electric lamps, horn, spares; £68.—Selves, Electricity Works, Hertford. [8842

B.S.A. Latest New Models in stock; chain-cum-belt Model K, £64; sidecars in stock to fit from 10 gns.; your present machine can be taken as part payment.—Elce and Co., 15-16, Bishopsgate Av., Cunomile St., E.C. [0551

B.S.A., 4½h.p., 1914, chain drive, and C.B. sidecar, 1916 engine, thoroughly overhauled by makers, solo until 1916, accessories and spares, handle-bar muffs, and mudshields; 45 gns. cash.—12, Edmund Rd., Saltley, Birmingham. [7136

1913 B.S.A. 2-speed, two in stock, belt drive, also one chain drive, £30 each; deferred payments arranged. All machines advertised by me have been thoroughly overhauled and guaranteed value for money —Jones, Garage, Broadway, Muswell Hill. [7700

B.S.A., 4½h.p., late 1914 model, 3-speed gear box, fast, powerful, and reliable, with B.S.A. £16/16 sidecar, speedometer, lamps, horn, and spares, all in good condition.—For further particulars and price, apply Bell, Highlands Lyminge, Folkestone, Kent. [8944

MAUDES MOTOR MART

SECOND-HAND BARGAINS

SIDECAR OUTFITS.

TRIUMPH, 3½ h.p., 2-speed countershaft, Sidecar	£30
ZENITH, 1914, 6 h.p., countershaft clutch model	£50
RUDGE, 1913, 5-6 h.p. Multi, with Rudge Sidecar	£40
ENFIELD, 6 h.p., 2-speed, twin, Enfield Sidecar	£29
RUDGE, 1913, 3½ h.p. Multi, coach-built Sidecar	*£30
SCOTT, 1914, 3½ h.p., 2-sp., and Scott sidecar	£47
ZENITH, 1915, 3½ h.p., twin, clutch, and C.B. Sidecar	£45
P. & M., 3½ h.p., 1913, 2-speed, C.B. Sidecar	*£40
JAMES, 4½ h.p., 1914, 3-speed, Empress Sidecar	*£45
SUNBEAM, 1915, 3½ h.p. Combination	*£68
SUNBEAM, 1916, 3½ h.p. Combination	£77
ZENITH, 1914, 8 h.p., clutch, and Sidecar	*£60

LIGHT CARS, Etc.

G.W.K., 1914, 8 h.p., just re-painted	£120
KNIGHT Junior, 1914, 11.9 h.p., sporting body	*£145
SINGER, 10 h.p., 5 lamps, just being overhauled	*£135
SINGER, 1913 (late), 5 lamps, dickey	*£140
HILLMAN, 1915, 9.5 h.p., speedometer, little used.	*£215
MATHIS, 1914, 15 h.p., 5-seater, dynamo	*—
SWIFT, 1915, 10 h.p., dynamo, like new	*£250
BELSIZE, 1912, 10-12 n.p., dynamo	*£135
FORD, 1913, 20 h.p., 5-seater, windscreen	£60
MORGAN, 1913, 8 h.p., hood and screen	*£60
CALTHORPE, 1916, 10 h.p., 4-seat, dyna. and start	£265
CALTHORPE, 1916, 10 h.p., 4 seat, dyna. and start	£275
A.C., 1915, 10 h.p., dynamo, luxurious finish	£275
HUMBERETTE, 8 h.p., 1913, wants overhauling	£36
SINGER, 1914, 10 h.p., dynamo set	£180

SOLO MOUNTS.

DOUGLAS, 1914, 2¾ h.p., 2-speed, T.T.	*£35
DOUGLAS, 1915, 2¾ h.p., 2-speed, model V	£45
DOUGLAS, 1914, 2¾ h.p., 2-speed	*£40
DOUGLAS, W. O., 1916, 2¾ h.p. 2-speed	£50
TRIUMPH, 1912, 3½ h.p., clutch model, Bosch	*£25
TRIUMPH, 1914, 4 h.p., 3-speed, Bosch	*£40
TRIUMPH, 1912, 3½ h.p., Standard touring	*£22
TRIUMPH, 1913, 3½ h.p., 3 speed, all accessories	*£30
TRIUMPH, 1914 4 h.p., 3-speed (late date)	*£42
TRIUMPH, 1909, 3½ h.p., delivered 12.12.08	£17
TRIUMPH, 1914, 4 h.p., 3-speed, electric horn	*£41
INDIAN 1914, 7-9 h.p., clutch model, speedometer	*£40
INDIAN, 3½ h.p., 1915, 3-speed, speedometer	£38
INDIAN, 1914, 7-9 h.p., T.T. model, very fast	*£36
B.S.A., 1916, 4½ h.p., 3-speed, mod. K., speedometer	*£54
ENFIELD, 1911, 2¾ h.p. twin, 2-speed, chain drive	*£20
ENFIELD, 1911, 2¾ h.p twin, Grado gear	*£14
HUMBER, 1914, 2¾ h.p. twin, light touring machine	*£17
HUMBER, 1914, 3½ h.p. 3-speed, water-cooled	*£38
CALTHORPE, 1914 (late), 2½ h.p., 2-sp., 2-str.	*£22
IVY, 1915, 2½ h.p., 2-stroke, Senspray carburetter	£12
REX, 1914, 4 h.p., 2-speed, and handle start	£25
PREMIER, 1913, 2½ h.p., single-cyl., fine lightweight	£12
F.N., 1912, 2¼ h.p., 2-speed, shaft drive	£12
RADCO, 1916, 2 h.p., single-speed, almost new	£20
CALTHORPE, 1914, 2 h.p., 2-speed, 4-stroke	£15

Machines starred (*) are complete with lamps, horn, etc.

NEW 1917 MODELS.

ROYAL ENFIELD, 2¾ h.p., 2-speed, 2-stroke	£44 2
B.S.A., 4½ h.p., 3-speed, belt, K, 1917 model	£64 0
B.S.A., 3½ h.p., Model D, T.T.	£52 10
ROVER, 1917, 3½ h.p., T.T., Philipson pulley	£61 10
HARLEY-DAVIDSON, 7 h.p., 17F, 3-speed	£93 0
HARLEY-DAVIDSON, 7 h.p., 17J, electric equip.	£102 0
HARLEY-DAVIDSON Sidecar to either of above	£24 10

NEW 1916's (Note Reduced Prices).

ROYAL RUBY, 2½ h.p., 2-speed, J.A.P. engine	£33 14
ROYAL RUBY, 2½ h.p., 2-speed, 2-stroke	£32 5
ROYAL RUBY, 2½ h.p., J.A.P., single-speed	£28 15
COVENTRY EAGLE 2½ h.p., single-speed, 2-stroke	£30 15
LEVIS 2 h.p. Popular model	£29 0

MAUDES MOTOR MART

100 & 136 Gt Portland St. London W.

Telephone 552 Mayfair Telegrams "Abdicole Wesdo

MOTOR CYCLES FOR SALE.

B.S.A.

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529

B.S.A., Model K, new, but very slightly shop-soiled, £59; also B.S.A. Model K, issued new Feb., 1916, with Hercules £14 coachbuilt sidecar, complete with lamps, tools, etc., £58; this latter outfit is almost new, and represents more than a bargain; also B.S.A. 1916 Model H (all chain drive), with roomy Millford coachbuilt sidecar, with wind screen and all accessories, including head and tail lamps, an outfit of more than usual merit, £60; and B.S.A. 1915 Model K, with low coachbuilt sidecar, completely equipped, overhauled, and thoroughly sound, £52/10. Will intending purchasers please note that we are prepared to give the most candid descriptions concerning any goods we offer, and willingly grant approval, always, because unless a deal can be concluded in a mutually satisfactory manner we prefer to cancel it. We ourselves take whatever risk there is.—If you desire a pleasant, straightforward, and profitable deal, write to Layton's Garage, Bicester, Oxon. [9029

Calthorpe.

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799

1917 Calthorpe, 2-stroke, 2-speed, new; also 1915 Calthorpe-Jap, second-hand, £26.—Pickering, Mardol, Shrewsbury. [X6778

1916 Calthorpe-Jap, Enfield 2-speed gear, accessories, and spare tank, perfect condition, new September; £24.—Summerlin, Bungalow, Ascott-under-Wychwood, Oxon. [X7093

P. J. EVANS, Birmingham and District Agent.—Calthorpe 1917 models in stock; two-stroke and four-stroke lightweights, and 4-5h.p. twins, solo or as combination.—John Bright St. [X7111

CALTHORPE-J.A.P.'s, 2-speed models in stock, 38 gns.; deferred terms if desired; also 1915 2-speed and accessories, fine order; £27/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8882

FIRST Cheque Secures.—Genuine late 1914 2¾h.p. Calthorpe, 2 speeds, tyres, plating, etc., very good, tools, etc., etc., wants new big end (cost about 4/-); first £12/10 secures it; wonderful bargain.—Letters only, Pte. Millard, M/205777, Section 2, Eildon Billet, Catford. [X6995

Campion.

CAMPION Motor Cycle, sidecar, all accessories, recently overhauled, 4h.p., 2-speed; £25, or nearest offer; splendid bargain.—Reffin, Seagrave Rd., Sileby, Loughborough. [X7045

Chater-Fafnir.

3h.p. Chater-Fafnir, T T. bars, lamps, horn, and knee-grips, perfect order, fast; £18.—65, Silverdale, Sydenham. [8940

Chater-Lea.

CHATER-LEA 8h.p. Combination, 3-speed countershaft; bargain, £35.—306, New Cross Rd., S.E. [8827

Chater-Lea-Jap.

CHATER-J.A.P., 4h.p., coachbuilt sidecar, 2-speed, lamps, etc.; £29, or nearest.—Kirk, 26, Bismarck Rd., Highgate. [8853

PETROL Free with 1912 Chater-Lea-Jap, 8h.p., 3-speed countershaft, coach sidecar; 34 gns.—Rider Troward's, 78, High St., Hampstead. [8985

4h.p. 1915 Chater-Lea-Jap Coachbuilt Combination, countershaft gear, and clutch, fully equipped, equal to new; £55.—82, Caledonian Rd., London. [8942

Chater-Peugeot.

CHATER-PEUGEOT. 5-6h.p., and sidecar, spring forks, mag., splendid condition; £25.—119, Canmatra Rd., West Hampstead. [8835

7-9h.p. Chater-Pengeot, sidecar, 2 speeds, free. Bosch, B. and B., Stelastic, good order; £22.—26, Waverley Rd., Plumstead. [X7100

Chater-Lea-Precision.

CHATER-LEA-PRECISION, 4½h.p., 2 speeds, Montgomery sidecar, Pillion seat; perfect condition; £45, or nearest.—4, Munday St., Charminster Rd., Bournemouth. [8930

Clyno.

CLYNO 1912 6h.p. Combination, £35/10; Clyno, 6 h.p., 3 speeds, £24/10.—Motor Exchange, Horton St., Halifax. [8888

CLYNO 6-7h.p. Twin Coach Combination, 1913, as new; cash wanted; £35.—H., 48, Herne Hill Rd., Loughborough Junction, S.E. [8909

CLYNO Combination, abundance of spares, 5 gn. speedometer; £47/10.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [8667

CLYNO, 1915, 2¾h.p., 2-stroke, 2-speed, clutch, all on, private owner; £18.—Seen at Jewel's Garage, 168, Archway Rd., Highgate. [8864

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

PETROL Free with 1914 Clyno coachbuilt combination, detachable wheels, 3-speed, electric lights; 52 gns.—Rider Troward, 78, High St., Hampstead. [8980

CLYNO, 1915, 2¾h.p., 2-stroke, 2-speed, h.b.c. clutch, Lucas lamps, horn, speedometer, etc., practically new, unused last year; £28/10.—27, Ormeley Rd., Balham, S.W. [8931

MOTOR CYCLES FOR SALE.

Connaught.

BIRMINGHAM Agent, P. J. Evans, John Bright St.—1917 models of the famous Connaught two-stroke, standard 2¾-3h.p. models, either solo or with sidecar; miniature models, single or 2-speed countershaft gear; prices from 27 gns. [X7106

Diamond.

1917 Diamond, spring frame De Luxe, very few about; cheap.—4, Newbridge Crescent, Wolverhampton. [X7038

Douglas.

DOUGLAS, 1912, 2 speeds; £18.—5, Queen's Gate Mews, Kensington. [8806

1914 Douglas, T.T. bars, complete, lamps, etc.; £34.—Cross, Effingham Sq., Rotherham. [X7103

DOUGLAS, 1915, 2¾h.p., 2-speed, Colonial model, lamps, horn, speedometer, etc.; £43.—Below.

DOUGLAS, 1912, 2¾h.p., single speed, lamps, horn, speedometer, etc.; £22.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0597

DOUGLAS, 1915, T.T., £40; 1915 racing 2-stroke, £20.—51, Maplethorpe Rd., Thornton Heath. [8914

DOUGLAS, 1914, 2¾h.p., T.T. model, with accessories; £42/10.—Motor Exchange, Horton St., Halifax. [8889

DOUGLAS, 1914¾, 2-speed, good condition, splendid running; letters only; £31.—Rev. S. Fowler, Roche, Cornwall. [X6964

DOUGLAS, 1912½, 2-speed, kick starter, F.R.S. head light, good as new; £27, offer.—35, Colwell Rd., E. Dulwich, S.E. [8913

DOUGLAS, 4h.p., 2 speeds, clutch, kick starter; £48; exchange entertained.—124, Walton Rd., Hampton Court. [X7145

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Yeovil. Tel.: 50. [5855

DOUGLAS, 1914 model, 2-speed, £32; 1913 model, 2-speed, £30; 1911 model, £16.—Baker and Sons, Friar St., Reading. [X7069

DOUGLAS, 2¾h.p., 1913, 2 speeds, nearly new Dunlop tyres, complete equipment; £28.—W. P. Edwards, Taunton. [X7076

1915 2¾h.p. Douglas, lamps, all accessories, as new, under 1,000 miles; £45.—O.M.E., Oakwood, Slades Hill, Enfield. [X6828

1913 Douglas, 2¾h.p., 2-speed, kick starter, complete; £32/10; not used past 12 months.—Box L3,233, c/o *The Motor Cycle*. [8907

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

DOUGLAS, 1914 (late), 2¾h.p., 2 speeds, kick start, clutch; £40.—Mr. A. Lane, 14, Malham Rd., Forest Hill, London, S.E. [8943

DOUGLAS, 2¾h.p., fine order, new tyres, plating, enamelling new, only wants seeing; £17.—14, Doubrooke Rd., West Norwood. [0869

DOUGLAS, 2¾h.p., 1913-14 model, 2-speed, F.E., etc.; 25 gns.; appointment.—W. Pilford, Greyhound Lane, London, S.W. [8961

TWO 1915 2¾h.p. 2-speed Douglas's, and accessories, in good condition; £42/10; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [8854

1914 Douglas, 2¾h.p., 2-speed, F.E., lamps, horn, tools, Bosch mag.; £34; exchanges.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [9054

DOUGLAS Specialists.—Gibb, Gough, London Rd Gloucester. Gibb, the International Douglas rider, winner of numerous cups and gold medals. [2218

1913 2¾h.p. Douglas, 2-speed, nearly new Dunlops, lamp, horn, just overhauled, T.T. or touring bars; £28.—Robinson's Garage, Green St., Cambridge. [9007

1912 Douglas, T.T., 2¾h.p., 2-speed, lamps, in good condition; £26.—Wellboy Motor Garage, Woodford Rd., Forest Gate. 'Phone: Stratford 309. [8870

1914 Douglas, T.T., 2¾h.p., 2-speed, lamps, horn, and accessories; £40.—Wellboy Motor Garage, Woodford Rd., Forest Gate. 'Phone: Stratford 309. [8871

1915 Douglas, T.T., 2¾h.p., 2-speed, lamps, horn, in splendid condition; £50.—Wellboy Motor Garage, Woodford Rd., Forest Gate. 'Phone: Stratford 309. [8872

1915 2¾h.p. W.O. Douglas, lamps, horn, speedometer, tyres good, little used; bargain, £41.—Dr. J. K. Garner, The Lord Derby War Hospital, Warrington. [X7052

DOUGLAS, 1913, 2-speed, 2¾h.p., tyres as new, excellent running order, just overhauled; highest offer above £25.—Finch, Penfillan House, Folkestone. [X6835

DOUGLAS, 1914, 2¾h.p., 2-speed, semi T.T. bars, just overhauled, in splendid running order; £38, or near offer.—Can be seen at Douglas Bros., Newman St., London. [8865

1915 Douglas, 2¾h.p., Model U, 3-speed gear, footboards, Lucas horn, rear lamp, head lamp, and spares, condition as new; £45, lowest.—W. Jenkins, Chapel-en-le-Frith. [X6836

DOUGLAS, 1915-16, 4h.p., 3-speed, T.T., fitted with Burbury coachbuilt sidecar, disc wheel, lamps, and horn, in excellent condition; £59.—Clifford House, Holmer St., Hereford. [X7152

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2½ h.p. **LEVIS**, Model E, 2-sp. Enfield gear, rustless rims	£47 10
2½ h.p. **LEVIS**, Popular model	£32 0
3½ h.p. **ARIEL**, 2-sp., solo, kick-start	£65 10
2¾ h.p. **CALTHORPE-J.A.P.**, 2-sp., feather-weight, 3 models in stock	£39 16
2½ h.p. **NEW HUDSON**, 2-sp., Model C	£35 0
7-9h.p. **HARLEY - DAVIDSON**, Mod. 16F, and Sidecar, 1916 model	£102 9
2½ h.p. **ROYAL RUBY**, single-speed	£47 5
2½ h.p. **ROYAL RUBY**, 2-speed	£40 0
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2¾ h.p. **NEW HUDSON**, 1912, 3-sp., J.A.P., lamps, horn	£18 10
3½ h.p. **ROVER**, 1913, Philipson pulley, 2 lamps, horn, very fast	£35 10
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Douglas.

DOUGLAS, 2¾h.p., Model U, 1915, 3-speed gear, footboards, upturned or touring bars, lamps, horn, speedometer, in perfect order; £45.—Robinson's Garage, Green St., Cambridge. [9008

DOUGLAS, 2¾h.p. (late 1915); splendid condition, all accessories; owner going on active service.—Apply, A. Hall, Wallfield, Whitefield Rd., Stockton Heath, near Warrington. [8557

DOUGLAS, 2¾h.p.—Brand new Models W (clutch, kick start) and U; deliveries in few days—to doctors and farmers. Write for particulars.—Robinson's Garage, Green St., Cambridge. [9009

DOUGLAS, 2¾h.p., 2-speed, clutch, kick starter, 2¼ Dunlops, Cowey speedometer, Lucas head light, touring equipment, supply of petrol; £35; seen after 6.—Tintagel, Sefton Rd., Addiscombe. [X7115

DOUGLAS, 1914½, T.T., 2-speed, 2¾h.p., footboards, lamps, speedometer, mechanical horn, new tyres, Binks carburetter, additional tank, good condition, £38; Henderson sidecar for same, practically new, £6.—S. A. Milbank, Pharmacist, Bishop Stortford. [X6991

LATE 1915 4h.p. Douglas, done 1,500 miles, complete with lamps, horn, tools, etc., also 1916 Douglas sidecar, not soiled, £68; immediate delivery of latest 2¾h.p. War Office Model Douglas, all the latest improvements.—Bennett, West St., Fareham, Hants. [8807

LATE 1915 Douglas 2-speed T.T. Colonial Model, all black, large, long extended exhaust pipe, Lucas horn, P. and H. head (large), rear lamp, etc., foot board or foot-rest optional, in real good order, guaranteed perfect; £45.—Jones, Garage, Broadway, Muswell Hill. [8768

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012

Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2¼h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

2¾h.p. Enfield Twin, in good condition; £12.—Barnwell's Garage, Fleet, Hants. [8998

RIDER TROWARD'S, 78, High St., Hampstead.—1915 Enfield, 3h.p., as new; 35 gns. [8991

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields [0801

ENFIELD 6h.p. 1917 Standard Combination, £94/10 (2-seater sidecar £3 extra).—Lamb's (below).

ENFIELD 3h.p. 1917 Solo Model, T.T. and touring; £57/15.—Lamb's (below).

ENFIELD 2¼h.p., 1917, 2-stroke, 2-speed; £44/2.—Lamb's, below.

ENFIELD 1916 Commercial Combination, new two months ago, mileage 400, £90; also 1916 (very late) combination, 3 lamps, horn, hood and screen, £85.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. Tels.: Walthamstow 169, and Hornsey 1956. [8883

1916 Enfield Combination, 6h.p., like new, recently overhauled; £78.—47, Woodcote Rd., Wanstead. [8973

1917 6h.p. Royal Enfield, new, with delivery van or coachbuilt body; price 90 gns.—Ireland, Sankey, Warrington. 'Phone: 8 Penketh. [X7053

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock for immediate delivery.—See below.

1917 6h.p. Enfield Coachbuilt Combination, with apron and mat, 2 speeds, clutch and starter, 90 gns.; extra for hood and screen, £4/19; Lucas lighting set, 15 gns.—Below.

1917 3h.p. Enfield, solo or sidecar mount, 2 speeds, clutch, and kick starter; 55 gns.; sidecars from 7 gns.—Below.

1917 Enfield Two-stroke, 2¼h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright St., Birmingham. [X7109

1913-14 Enfield Combination, coach sidecar, £57/10; 1912 Enfield combination, cane sidecar, £41/10.—Collier's Motories, Deal St., Halifax. [8890

ENFIELD 1916¾ 6h.p. Combination, fully equipped, equals new in every detail; a bargain, 65 gns.—Percy and Co., 337, Euston Rd., London. [9043

ENFIELD, 6h.p., late 1913 coach combination, new tyres throughout, splendid condition, hood, apron, spares; £43.—13, Arklow Rd., New Cross, S.E. [8858

ROYAL Enfield Combination, 1913 model, perfect condition, 6-8h.p. J.A.P. engine, complete; £45.—Kershaw's, garaged at Wray Park Garage, Reigate. Call. [8929

1916 Enfield, 3h.p., T.T. Binks, 2-speed, kick start, Miller head, Lucas rear; owner going on active service; £45.—Banner, Brooklyn, Highfield, Rockferry, Cheshire. [X7086

1916 6h.p. Royal Enfield Combination, lamps, horn, speedometer, ridden 600 miles, condition like new; £75; accept solo and cash.—Viggers, 3, Trinity St., West Bromwich. [X7092

1916 6h.p. Royal Enfield Combination, complete with lamps, horn, speedometer, in perfect condition; 75 gns.—Wellboy Motor Garage, Woodford Rd., Forest Gate. 'Phone: Stratford 309. [8873

MOTOR CYCLES FOR SALE.

Enfield.

1916 3h.p. Twin-cyl. Lightweight Royal Enfield, 2-speed gear, kick starter, chain drive, Lucas horn, Palmer cord tyres, condition as new; £38.—The Premier Motor Co., Aston Rd., Birmingham. [9001

ENFIELD 3h.p. Twin, 1915, in excellent condition, with P. and H. lamps, and Lucas horn, mileage 1,000, £42; Canoelet lightweight sidecar to match, unused, £8.—Wallace, 56, Eton Av., Hampstead, N.W. [8826

1916 6h.p. Enfield and Sidecar, perfect, new June, tyres all good, spare butted tube, special car generator for head light, all lamps, etc., only about 1,500 mileage, well kept; £75.—Simpson, 78, Gayton Rd., Harrow. [8945

1916 Enfield (Colonial Model), first-class condition, Lucas King Road generator and lamp, King's Own and rear generator, lamp, Jones speedometer, apron, mat, horn, pump, outfit, tools, etc.; £75; sale reason, 1917 machine delivered.—Smith, 23, Richmond Rd., King's Cross. [X6954

Excelsior.

EXCELSIOR, 2¼h.p., September, 1916, 300, guaranteed perfect; £24.—Capps, Hawthorn, King's Lynn. [9016

AMERICAN Excelsior, 7h.p., 3-speed, actually in stock for immediate delivery, the last batch to arrive in England, and complete with every latest refinement; £75, or with Montgomery coachbuilt sidecar, enamelled to match, £90; liberal exchanges.—The Premier Motor Co., Aston Rd., Birmingham. [9000

F.N.

F.N., 4-cyl., 2-speed, Amac; £15, offers, or exchange —40, Replingham Rd., Southfields. [8912

CALLED Up; must sell.—1913 F.N., 5-6h.p., good condition; bargain, first cheque £15 secures.—Cook, Nuncargate, Notts. [8814

F.N., 2½h.p., in excellent condition, with accessories; £9, bargain.—L. W. Richardson, 159, Victoria Dock Rd., Tidal Basin. [8924

4½h.p. 4-cyl. F.N., dropped frame, engine been overhauled, requires enamelling, and back tyre; £8, or offer.—Knowles, 12, St. Peter's Rd., Stockton-on-Tees. [8920

Grandex.

GRANDEX Precision, 2¾h.p., 2-speed; offers wanted; running order.—Ponting, Ponds, Purton, Swindon. [X7051

RIDER TROWARD'S, 78, High St., Hampstead.—Grandex-Precision, 4h.p., T.T., 1917, new, 31 gns.; Grandex-Villiers, 1917, 2-speed, new, 31 gns. [8992

Grippon.

GRIPPON, 2½h.p., B. and B. carburetter, pedal starter, good tyres; £5.—Maxim, 31, Hamthorpe Rd., West Norwood. [0890

Harley-Davidson.

HARLEY-DAVIDSON Combination, new, in stock.—Pickering, Mardol, Shrewsbury. [X6776

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for immediate delivery 1917 Harley-Davidsons. [7863

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802

LATE 1915 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0861

HARLEY-DAVIDSON New 1917 Models in stock; Model 17F, 7-9h.p., 3-speed, £93; also one new 1916 7-9h.p., 3-speed, Model 16F, left in stock, £84/15; cash, exchange, or extended terms quoted.—Below.

HARLEY-DAVIDSON, 1916, 7-9h.p., 3-speed, Model 16J, electric lighting, and sidecar complete; £80.—Below.

HARLEY-DAVIDSON, 1915, 7-9h.p., 3-speed, lamps, horn, etc., overhauled; £46.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0552

1917 Harley-Davidsons.—We are now making immediate delivery of either electric or magneto models; no waiting (only limited number available).—Harley-Davidson Scottish Depot, 98, Gt. Western Rd., Glasgow. [X6675

WE Have Several shop-soiled and slightly used 1915 and 1916 Harley-Davidson combinations, all fitted with Gloria sidecars, to clear at bargain prices; list free upon request.—The Premier Motor Co., Aston Rd., Birmingham. [9002

PETROL Free with 1915 Harley-Davidson, 7-9h.p., 3-speed, 49 gns.; 1914 7-9h.p. model, 2-speed, 39 gns.; 11J electrically-equipped combination, new July, mileage under 2,000, 69 gns.—Rider Troward's, 78, High St., Hampstead. [8983

HARLEY-DAVIDSONS.—Immediate delivery; new magneto models, £84/15; several second-hand 1915 and 1916 combinations from £65; exchanges arranged —Colmore Depots, 31, Renshaw St., Liverpool, and 211, Deansgate, Manchester. [0885

HARLEY-DAVIDSONS.—Five genuine 1917 models in stock, electric equipment, £102; standard model, £93; Model C sidecar, £24/10; Model B, £22/10; only limited number of these machines available; order now.—Lamb's, 151, High St., Wolthamstow, and 50, High Rd., Wood Green. [8880

Henderson.

HENDERSON, 4-cyl., late 1915, coachbuilt Mills-Fulford sidecar to match, Cowey speedometer, mechanical horn, full equipment, lamps, and Miller generator; £85.—Moxham, Rodney Rd., Newport, Mon. [X7150

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5 h.p.	**CLYNO,** military model, with Side-car, spare wheel, and luggage grid .	£108 3
7 h.p.	**INDIAN,** Mod.C, 3-sp.,S'car Com'bn	£99 0
5 h.p.	**INDIAN,** Mod.B,3-sp.,S'car Com'bn	£86 10
3½ h.p.	**ZENITH,** clutch, Model B	£70 0
4½ h.p.	**B.S.A.** Model H	£66 0
4½ h.p.	**B.S.A.,** Model K	£64 0
3½ h.p.	**EXCELSIOR,** single-cylinder, 3-sp., countershaft gear	£65 0
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2¼ h.p.	**EXCELSIOR,** 2-stroke, 2-speed ..	£39 5
2¼ h.p.	**EXCELSIOR,** 2-stroke, single gear	£30 16
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2½ h.p.	**NEW IMPERIAL,** Model No. 2, 2-speed, clutch, and kick-starter	£48 6
2½ h.p.	**NEW IMPERIAL,** Model No. 1, 2-sp.	£40 19
2⅝ h.p.	**ALLON,** 2-stroke, 2-sp. gear, clutch, brake, and chain guards	£48 0 9
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2¼ h.p.	**LEVIS,** 2-sp., Model E, chain drive	£47 10
2¼ h.p.	**LEVIS,** 2-stroke, Popular model ..	£32 0
2½ h.p.	**DIAMOND-J.A.P.,** Enf'ld 2-sp. gear	£40 19
2¼ h.p.	**SPARKBROOK,** 2-stroke, 2-speed	£40 0
2½ h.p.	**CALTHORPE-J.A.P** , 2-speed	£39 18
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Hobart.

HOBART, 2-stroke Villiers engine, 2-speed, Dunlop tyres, not done 100 miles, nearly new; £30.—Boylett, The Boys, Pirbright, Surrey. [8847

HOBART, 3½h.p., Grade gear, new tyre, belt, complete with lamps and horn, in good condition; £13.—45, Sansom St., Camberwell, S.E. [8848

Humber.

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882

HUMBER, 1917, latest models, 3½h.p. and 6h.p. horizontal twins, actually in stock.—Moss, Wem. [X7129

1914 3½h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863

HUMBER, 1911, 3½-4h.p., 2-speed and free engine, good order, new tyres; £16.—H. Rushworth, Howefield, Cononley, Yorks. [X6998

3½h.p. Humber, 2-speed, free, 1910, £15; Mahon clutch, 30/-; B. and B. carburetter, 15/-; 1912 Triumph piston, pin, and rings, 8/-; 2½h.p. Motosacoche, m.o.i.v., £12/10; coachbuilt sidecar body, 47/6; complete sidecar, wicker Canoelet, quickfit, 70/-; all above in perfect condition.—349, Gloucester Rd., Bristol. [X7146

Indian.

INDIAN, 5-6h.p., 1915 model, excellent condition; £45.—Baker and Sons, Friar St., Reading. [X7070

INDIAN, 7h.p., 1915, top-hole condition; trial pleasure, lamps, horn, speedometer; £45.—Blackburn, Coningsby. [8846

1915 Indian, 5h.p., 3-speed, little used, Lucas lamp, horn, tools; £45.—Keable, 111, High St., Guildford, Surrey. [8917

THIS Week's Bargain.—1914 Indian, 7h.p., clutch, grand condition; first £28 gets it.—9, Bulstrode Rd., Hounslow. [8976

INDIAN, 1915, 7-9h.p., 3-speed, with Mills-Fulford sidecar, electric lighting, spare chain, bulbs, valves, etc.; £68.—Below.

INDIAN, 1915, 3½h.p. twin, 3-speed, semi-T.T. light wicker sporting sidecar, accessories, nearly new tyres; £43.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0492

INDIAN, 3½h.p., and sporting sidecar, 1915, 3 speeds, and kick starter; offers.—C/o Clayton's Garage, Wallington, Surrey. [8941

INDIAN, 5-7h.p., 1915 model, 3-speed, kick start, accessories, and lamp, sidecar, complete; £52.—A. Gazzar, Pembroke, Oxford. [X7025

INDIAN, 1916, 5-6h.p., 3-speed, clutch, kick starter, not done 1,000 miles; £50, or offer.—Rawlinson, 53, Brownlow Hill, Liverpool. [X6962

RED Indian, 5h.p, 3-speed twin, and Mills-Fulford sidecar to match, very fine condition; £62/10.—Motor Exchange, Horton St., Halifax. [8891

PETROL Free with 1912 Indian, 5h.p. T.T, 24 gns.; 1913 7-9h.p. Indian, spring frame, 2-speed, clutch, 35 gns.—Rider Troward's, 78, High St., Hampstead. [8989

INDIAN, 3½h.p., 1914, and sporting sidecar, 2-speed, kick starter, lamps, horn, etc., Dunlop tyres, all in thorough order; £35, or near offer.—7, West St., Horsham, Sussex. [X7028

INDIAN, 7-9h.p., T.T., 1915½, clutch model, as new, 500 miles, £48, or exchange countershaft twin with gears, for sidecar work, any good make; seen by appointment.—20, Cambridge Rd., Horsham, Sussex. [X7027

OFFICER going to Front would sell at bargain late 1915 7-9h.p. Indian and racing Middleton sidecar (only been used short time), lamps, Klaxon, etc., splendid order; £55.—Brevetor, Los Augeles, Mill Hill, London. [X7032

LATE 1915 5-6h.p. Indian Motor Bike, fitted with Mills-Fulford sidecar, 3-speed, free engine, kick starter, speedometer, mechanical horn, and other accessories; owing joining colours; price £55.—Chauffeur, 51, New St. Mews, Baker St., W. [9028

1916 5h.p. T.T. Model Indian, countershaft 3-speed gear, kick starter, clutch, 28×3in. extra heavy Dunlop tyres as new, Stewart speedometer, mechanical horn, guaranteed perfect throughout, very fast machine; £55.—The Premier Motor Co, Aston Rd., Birmingham. [9003

Ivy.

IVY-PRECISION, 4½h.p., in fine order and condition; £20.—Maxim, 31, Hamthorpe Rd., West Norwood. [0871

IVY-J.A.P., 1914, 3 speeds, new back tyre and belt, machine in splendid condition; £36.—Downing, Mapperley, Derby. [X7119

James.

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803

JAMES, 1913, 86×96, countershaft gear, and coach sidecar; £39/10.—Motor Exchange, Horton St., Halifax. [8892

JAMES 2-strokes, 1917 models, for immediate delivery.—Colmore Depot, 211, Deansgate, Manchester. [0888

JAMES, new 1917 models in stock: 3½h.p. twin, 3-speed chain drive, £69/10; cash, exchange, or deferred terms.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0480

MOTOR CYCLES FOR SALE.

James.

JAMES 1915 No. 6 Combination, 4¼h.p., 3-speed, lamp, horn, speedometer; £57/10; deferred payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [8879

JAMES, 1917 models, for immediate delivery from stock. Big "Four" combinations, with and without Lucas dynamo lighting set; 3½h.p. twin, and two-stroke models.—P. J. Evans, John Bright St., Birmingham. [X7110

Lark-Jap.

LARK-JAP., 1916, 3½h.p. single, T.T. bars, horn, speedometer, etc., fast machine; £22.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0479

Levis.

LEVIS, 2¼h.p., 1917, delivery from stock; £32.—W. P. Edwards, Taunton. [X7078

LEVIS, latest, brand new, single and 2-speed models in stock.—Moss, Wem. [X7130

LEVIS 2½h.p. Popular, late 1915, in first-class order; £22.—14 Dodbrooke Rd., West Norwood. [0895

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804

LEVIS, 2¼h.p., 1916, lamp, horn, not ridden 100 miles, perfect; what offers?—J. Whittingham, Walsall Wood. [X7033

LEVIS Popular, just arrived, owner unable to take delivery; cost £32, what offers.—Rowlands, 70, Sussex St., Winchester. [8939

LEVIS Popular, 1917 model, in use few weeks, £27; another supplied new December, 1916, £25.—Baker and Sons, Friar St., Reading. [X7068

LEVIS, 2¼h.p., new June, 1915, little used, just been thoroughly overhauled, fitted with Stewart speedometer; 21 gns., or near.—Johnson, 1, Norfolk Sq., Gt. Yarmouth. [8645

Lloyd.

LLOYD-VILLIERS, 2½h.p., 1916, 2-speed gear box, speedometer, lamps, horn, tools, condition perfect, tyres as new; £25.—60, Mayfield Rd., Sanderstead, Surrey. [X6022

L.M.C.

L.M.C., 1913-14, 4h.p., 2-speed countershaft, Bosch, 1916 Senspray carburetter, kick starter, in new condition; £30, or exchange higher power, cash adjustment. —102, Dalberg Rd., Effra Rd., Brixton, S.W. [8916

Martin.

RIDER TROWARD'S, 78, High St., Hampstead.—Martin-Jap, 3½h.p., overhead valve, record breaker, Binks; 24 gns. [8993

Matchless.

MATCHLESS Motor Cycles; no quicker delivery obtainable than from Colmore Depots. [0881

MATCHLESS 1915 8B Combination, F.R.S. head, P. and H. tail and side, Bosch, Amac, all accessories, as new; £72.—Rodwell, Brewery, Tring. [9015

MATCHLESS, 1914 (late), 7-9h.p., M.A.G. engine, 3 speeds, perfect condition, small mileage, not used since 1915; £60.—Roebuck, 19, Somerset Rd., Huddersfield. [X7122

MATCHLESS, 8h.p., 1913, Ivy sidecar, with screen, J.A.P. engine, Zenith gear, new tyre and belt, excellent condition; £40; must sell.—Smith, 15, Commercial St., Newport, Mon. [8975

New Hudson.

1915 New Hudson and coach sidecar, 3½h.p., 3-speed, clutch, kick start, in perfect order; £40, bargain. —Comer, Townsend, Reepham, Norfolk. [X7114

1915 2¼h.p. 2-stroke New Hudson, in perfect condition; £22, or near offer.—Wellboy Garage, Woodford Rd., Forest Gate. Tel.: 309 Stratford. [8876

1914 4h.p. Greg. New Hudson Combination, 3-speed, handle starting, in good condition; £40, or near offer.—Wellboy Garage, Woodford Rd., Forest Gate, Tel.: 309 Stratford. [8875

1915 New Hudson, 2-stroke, done about 200 miles, in new condition, excellent running order; owner joining up; £18, or near; must sell.—Stanley Old, Rosecroft, Westbury Terrace, Westerham, Kent. [X7037

NEW Hudson Big Six Combination, 1915½; I bought new from works June; 3-speed countershaft gear, clutch, chain-belt drive, first-class order; bargain, 60 gns.—Marriott, 9, Suffolk St., Birmingham. [X7116

1913 3½h.p. New Hudson, with cane sidecar, 3-speed, kick start, all lamps, etc., enamelling and plating guaranteed absolutely perfect; £30; extended payments arranged.—Jones, Garage, Broadway, Muswell Hill. [8769

New Imperial.

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Imperial-Japs. Immediate delivery. [7862

COLMORE Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0805

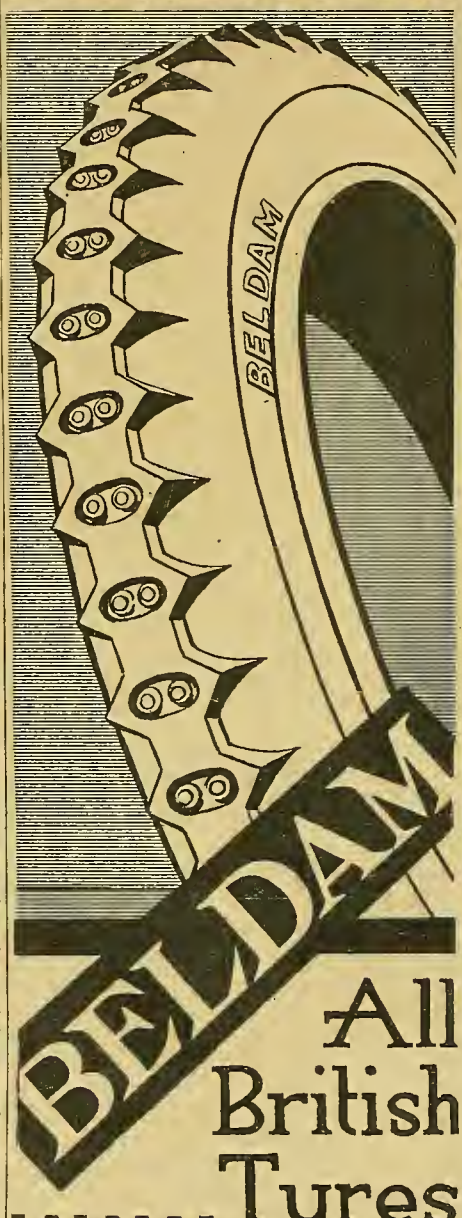
1916 New Imperial, 2-speed, almost new, in splendid order; £28/10.—Jones, Garage, Broadway, Muswell Hill. [8503

NEW Imperial Lightweight, 1917 models, from stock; 39 gns.; best value on the market.—Motories, 68, Horton St., Halifax. [8893

NEW Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0839

Beldam Retreads

The Plant, Materials, and Men behind BELDAM RETREADS are the same as employed in making the famous Beldam Tyres—Quality is the note all through. Have your old Tyres retreaded in the Beldam way before they get beyond repair. Estimate of cost by return post.—THE BELDAM TYRE CO., LTD., BRENTFORD, MIDDLESEX.



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Write for Prices.

The Beldam Tyre Co., Ltd., Brentford,—— Middlesex.

New Zealand: J. E. Fitzgerald, 139, Lambton Quay, Wellington. Cape Colony: The Tyre and Motor Co., Rodney St., Port Elizabeth. India Wilkinson and Co., 12, Dalhousie Square E., Calcutta. Ireland: P. Drohan & Sons, Carrick-on-Suir.

Godbolds.

MOTOR CYCLES FOR SALE.

New Imperial.

NEW Imperial-Jap, 2¾h.p., 2-speed, clutch, kick start, new October 7th, 1916, not done 100 miles; £38. —Leedham, 14, Norris Rd., Sheffield. [X7034

NEW Imperial, 1915, 2½h.p. J.A.P., 2-speed, lamps, etc., easy starter, perfect running, tyres, belt, etc., in splendid condition; 19 gns.—Logan, Chisenbury, Wilts. [X6953

NEW Imperial 1917 Models for immediate delivery; model 1, 39 gns., No. 2 46 gns.; several second-hand 1916 machines from £30.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0886

NEW Imperial 1917 Models in stock; light tourist, 2 speeds, countershaft, 38 gns.; clutch and kick starter models, also ladies' models ready to drive away.—P. J. Evans, Controlling District Agent, John Bright St., Birmingham. [X7108

N.S.U.

1915 N.S.U. 6h.p. Twin, 2 speeds, spring frame, Bosch, all accessories, Gloria spring wheel sidecar; bargain, £45.—Blake, 216-18, Westbourne Grove. [8965

O.K.

O.K. 1916 Lightweight, run 500 miles, only guaranteed equal to new; £21.—Percy and Co., 337, Euston Rd., London. [9046

2h.p. O.K. Motor Cycle, 4-stroke, countershaft 2-speed, engine just rebushed and overhauled by makers, P. and H. lamps, mechanical horn, tyres nearly new, 140 m.p.g., extraordinarily economical and easy to start, climbs 1 in 7; owner going Front: price £16.—Seen Rider Troward's, High St., Hampstead. [8634

P. and M.

1911 2-speed P. and M., complete, lamps, etc.; £23. —Cross, Jeweller, Rotherham. [X7104

LATE 1912 P. and M., 2-speed, chain drive, handle starter, good condition, tyres Kempshall front, Avon Steel back; bargain, £35 cash.—Brindley, 973, Abbeydale Rd., Sheffield. [X7147

P. and M. Combination, 1914, with genuine P. and M. coachbuilt sidecar, head and tail lamps, horn, etc., at the unrepeatable price of 40 gns., cash only.—Layton's Garage, Bicester, Oxon. [9030

Precision.

1915 Precision, 4¼h.p., Sturmey-Archer 3-speed and clutch, Bosch latest, B. and B., lamps, horn, new tyres, recently overhauled; £30.—37, Aylesbury St., Fenny Stratford, Bletchley. (D) [X6966

Premier.

1914 Premier, 2¾h.p., in excellent condition; £25; owner called up.—Gleave, A.S.C., Seaforth Barracks. [X6826

PREMIER, 3½h.p., 1912, new condition, perfect throughout; 15 gns.—245, Hammersmith Rd., London, W. [8969

PREMIER, 1912, 3½h.p., 2 speeds; £21/10, or with sidecar £24/10.—Motor Exchange, Horton St., Halifax. [8893a

PREMIER Combination, 3½h.p., 2 speeds; seen, trial by appointment; £28.—Taylor, 25, Barlby Rd., London, W. [X7056

1914 3½h.p. Premier, 2 speeds, coachbuilt sidecar; £45; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0823

PETROL Free with 1913 T.T. Premier, Brampton gear, special machine; 22 gns.—Rider Troward's, 78, High St., Hampstead. [8987

PREMIER, 1915, 3½h.p., 3 speeds, countershaft, kick starter, coachbuilt sidecar; £40; in perfect condition.—Percy and Co., 337, Euston Rd., London. [9049

Quadrant.

RIDER TROWARD'S, 78, High St., Hampstead.—Quadrant, 1913, 2-speed, perfect; 24 gns. [8995

QUADRANT, late 1914, 4½h.p., 3-speed solo, petrol starting device, splendid condition; £28.—50, Thornbill Rd., Barnsbury. [8365

QUADRANT, 3½h.p., spring forks, mag., good tyres and belt, good order, and fast; £12.—14, Dodbrooke Rd., West Norwood. [0872

PETROL Free with 1914 Quadrant combination, 3-speed, 33 gns.; solo, 29 gns.—Rider Troward, 78, High St., Hampstead. [8981

QUADRANT, 3½h.p., spring forks, D.B.T. engine, tyres, new belt, guaranteed in splendid condition; bargain, £6.—M. Hambett, 62, Newpark St., Devizes. [X7141

Radco

RADCO, 2¼h.p., late 1915, practically unused; £16, no offers.—14, Dodbrooke Rd., West Norwood. [0896

Rex

REX, latest model, 2 speeds, coach combination; £49/10.—Motor Exchange, Horton St., Halifax. [8894

REX 5h.p. Twin, 1914, free engine back hub, in first-class order and condition; £19.—Percy and Co., 337, Euston Rd., London. [9040

REX 6h.p. 1914 Coach Combination, almost new hood, screen, speedometer; £45; photo.—Holly House, Hanley Rd., Hornsey, London. [X6659

REX Twin, 5-6h.p., clutch model combination, Bosch mag., complete with coachbuilt sidecar; £14, bargain; seen by appointment.—Francis, 1a, Lausanne Rd., Hornsey, N. [8927

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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Manufacturing Permits Extended.

PERMITS for the manufacture of new motor cycles have new been extended by the Government in a letter which was characterised by a leading manufacturer as the most straightforward and concise official document he had yet seen. In a nutshell, this letter, which is issued on behalf of the Director General of Mechanical Transport, clears a point upon which motor cycle manufacturers have long been hazy, and says in effect that if we cannot use you and your factory upon Government work, then we will not hamper your output of motor cycles. For nearly two years past, as we have pointed out on several occasions, those factories which have been unsuccessful in obtaining Government work have been gradually denuded of men and machinery and have had to surmount all sorts of obstacles in endeavouring to pursue their staple trade—this in face of Government assurances that there is no intention to close any business.

There is an important alteration, too, in the method of distributing these machines. Machines in stock which were completed prior to February 24th may be supplied without a permit, manufacturers being urged in the National interest to exercise the greatest care that they may only be placed in the hands of those who must have them for work of real importance, such as doctors, farmers, etc. It is pointed out that it is not always in the National interest that a motor cycle should be used to enable a man to get to and from his work. We are glad to see emphasised in the letter of the Director General of Mechanical Transport the need to exercise the utmost endeavours to export the whole of the motor cycles manufactured. It is pointed out that this would not only save petrol consumption in this country, but would also benefit the exchange. In future a certain number of motor cycles may be supplied to agents provided the firm is satisfied as to their *bona-fides* and that the agents will give an undertaking that they will not dispose of the machine without a permit from the Director General's department.

"The Motor Cycle"—Twopence.

COMMENCING with the issue of March 22nd, the price of *The Motor Cycle* will be increased to twopence per copy. There is, perhaps, no need for us to detail the circumstances which render such a step necessary; readers will understand that the change is made only because the existing conditions compel it.

It is also our duty to respond to the steps taken by the Government in order to bring about a reduction in the consumption of paper and set free every available ship for food and munition supplies. To the extent that our circulation may be reduced by the increase of price we shall be assisting in the direction indicated.

We have no intention to pose as ultra-patriots in the matter; our record of National service is well known. *The Motor Cycle* has willingly been pressed into the service of the country in its hour of need whenever the opportunity occurred, and we shall continue that policy.

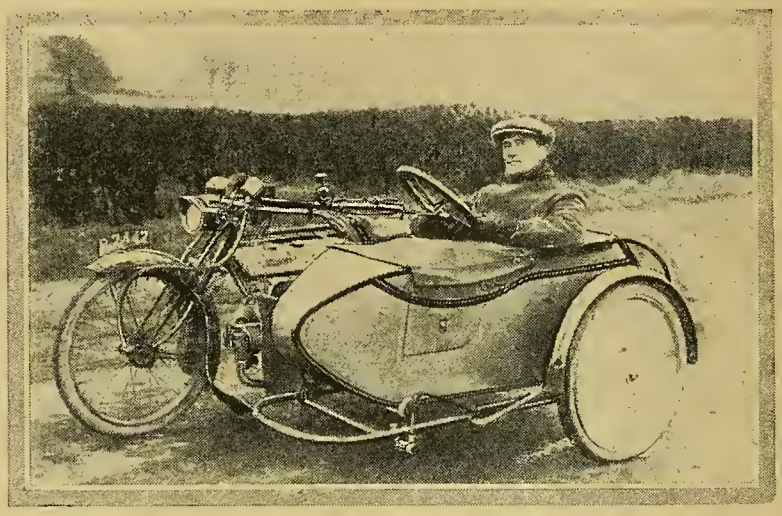
Quite apart from patriotic motives, however, it is necessary to increase the price of *The Motor Cycle* for the very simple reason that it is not possible to maintain the paper at its present high level, except at a very heavy and increasing loss, consequent upon the extraordinary increase in the cost of paper and every other commodity. We believe our readers will prefer to pay the additional penny per copy rather than see the editorial pages reduced, either in quantity or quality. It is, at all events, a test of their appreciation of and loyalty to the paper. A certain percentage may not respond to that test; others may elect to share their copy with a friend. The joint result may therefore be the retention of all our really keen and intelligent readers, and at the same time a legitimate reduction in our circulation.

An index to the advertisements in this issue will be found on the page facing the back cover.

DRIVING FROM THE SIDECAR.

A Practical Conversion for All-weather Riders.

THE idea of controlling a machine from the sidecar seat is not, of course, new. On several occasions we have illustrated machines with devices having this object, but usually tiller steering has been preferred. We believe Mr. George Brough was the first to use wheel steering for this purpose, a photograph appearing in these columns on April 20th last year showing his flat twin so converted. Mr. W. A. McKeggie, the owner of the machine now illustrated, speaks enthusiastically of his "cycle car"—composed of the flat twin Brough and an attractive Derwent sidecar—and appreciates its comfort and cleanliness, particularly in winter. He has run it for four months and finds it easy to control and steer. No doubt many who habitually use their sidecars, and are obliged to travel in all weathers, will be tempted to adopt a similar arrangement. An ordinary tiller can be used if it be found impossible to adapt a steering wheel.



A method of solving the mud and weather problem. It will be agreed that the effect is pleasing.

One of the objections to driving from the sidecar is the inaccessibility of the brakes. Complete control of these important fitments is even more essential than when driving from the saddle. On some machines the brake spindle can be carried through the sidecar body and a lever fitted inside. However, those who contemplate this method of driving had better consider the braking question first of all in conjunction with the Bowden wire catalogue; if this can be solved satisfactorily then the levers and gear change will be fairly easy to transform.

FRONT HUB DESIGN.

HOW MUD MAY BE KEPT OUT OF THE BEARINGS.

ON the subject of front hub design a correspondent, Mr. Douglas W. Grover, writes as follows:

"The last two machines I have had have both been 8 h.p. combinations, and although I have had no trouble at all with back wheel bearings, I have had continual front hub trouble. I therefore infer that the protection afforded the back hub by the brake drum on one side and the chain case on the other is what makes the difference in the life of the bearings. I think if mud can be prevented from entering the front hub it will last as long as the back one.

"My idea is to have the front forks wider and a longer spindle, but hub the same width. On the spindle a thin metal disc is placed next the cone, and then a distance-piece to make up the extra width of forks. The disc could be about the size of the lid of a boot polish tin, and might possibly be turned over at the edges similarly with advantage. The effect of this arrangement would be that the wet mud which runs down the forks all the time in wet weather would fall not on the cones as at present, but on the distance piece, and would be prevented from reaching the cones by the metal disc which would, of course, be stationary on the spindle. The idea would work especially well with that type of hub that has the cup as the external adjusting member with knock-out spindle."

This idea is a very sound one, and was, in fact, alluded to as a desirable feature in our article on "The Hubs of Motor Cycles" published on March 30th of last year. The advantage of wider forks and greater clearance was then pointed out, and a hub which embodied this special point (but without distance-pieces), viz., the Lea-Francis, was then illustrated with favourable comment. In the Lea-Francis hub the space which might be occupied by a distance-piece is occupied by a lock-nut, which enables the wheel to be removed and replaced without disturbing the adjustment of the bearing—another excellent point. Several makers adopt this lock-nut on their rear hubs, but it is most uncommon on front wheels. It is quite usual, too, for the rear hub to possess the advantage of greater clearance between fork and hub, and the forks themselves do not so readily convey mud to the centre of the wheel. On June 15th last we published a tip commonly used by despatch riders with the same end in view.

Those Auxiliary Motors.

IT is a little difficult for those of us who like 60 m.p.h., when we can get it, to believe that the big sales can ever centre round "trundling a tea-tray astern" (as a friend of mine terms motor cycling with a motor-wheel), or putting a small sea-plane starter on the flapper bracket. But simplicity, handiness, and cheapness are colossal assets, and if the economical featherweight is just about the terminus of development in any line of engineering, and therefore the last arrival of all, it often proves to be the one far off event towards which creation moves. I remember how we used to wrestle with 1¾ h.p. Minerva engines lightly clipped to the front down tube of a mildly stiffened push-bicycle, and how unspeakably obsolete they seemed when the early Excelsior came along with its 2¾ h.p. M.M.C. engine —a great lumbersome brute, with many faults, but always sweet in memory as the first real motor bicycle. Since then we have seen many attempts to produce a good lightweight, and perhaps we have not got it yet; but if the baby two-stroke is still a trifle "young," in the obnoxious sense of the word, it has at any rate proved that a good, cheap, light machine will boom the sport as nothing else could. So eventually, I suppose, quaint little jampot power units, which one will buy at gramophone dealers, and attach to push bicycles with a 4in. screwdriver and a few bands of tinfoil, may rule the motor cycling roost. Perhaps I shall just not be too old to appreciate their docility when they arrive; but as yet, thank goodness, give me something with two whopping cylinders to it, and, for choice, overhead valves.

Four-speed Gear Box Ratios.

I THINK I am already in a position to answer my own query about the best ratios for a four-speed gear box; readers may remember I expressed surprise that a certain gear box was rationed at 4½, 5½, 9½, and 13½, my surprise having reference to the long drop from third to second speeds, whereas a second ratio of about 7½ would have seemed more reasonable. The secret probably lies in the revolution capacity of the engine. The engine in question is fitted with a Claudel-Hobson automatic carburetter, which, after the manner of car carburetters, has a much longer arc of motion on its throttle lever than motor cycle carburetters possess; the arc is very nearly 180°, speaking from memory. When I first drove this machine I imagined that the throttle was wide open when it was really about half shut, and so the idea of the gear ratios never dawned on me. When I found I could open the throttle about as much again, I began to realise what the machine could do on a 9½ gear. You can twist it round at the foot of a 1 in 6 grade, and climb in a perfect frenzy of crescendo speed. With either a higher gear or a less willing engine, such a climb would be a miserable crawl by comparison. In this case, at any rate, the ratio plotting is undoubtedly justified in the interests of fast hillwork, and depends on the unusual range of the engine for its value and usefulness.

Two-stroke Piston Rings.

A CORRESPONDENT takes me to task for inferring that the top piston ring of a two-stroke engine becomes irreparably stuck in its groove as the combined result of overheating and over-oiling. He insists that under-oiling is the secondary cause, and defines under-oiling as supplying no more oil than the makers specify. If it be true that a slight increase in the oil supply will cure this ring-sticking nuisance a good many readers would employ the tip, as some engines are terrible sinners in this respect. But I am not so certain that he is right. I am a fast rider, and my normal routes are very hilly. As a consequence, when I use an engine disfigured by this particular weakness the trouble is very pronounced, and I can dogmatically assert that over-oiling will not cure it under the circumstances described, at least not with any engine I have tested. Examined theoretically, the cause seems to be that excessive heat deposits the incombustible residues of the lubricant in the groove in such quantities and at such a rate that the ring gets jammed. The oil residues would seem to be an essential factor. The heat cannot affect the dimensions of the ring and the groove so materially and so permanently as to weld the two together without the aid of heavy carbon deposits. If carbon deposits are necessary to effect the jam, a reduction in the supply of oil should delay the accumulation of deposit; an increase in the quantity of oil would lead to much heavier deposits, without an appreciable lowering of temperature! I think he is wrong.

Countershaft Gear Box Design.

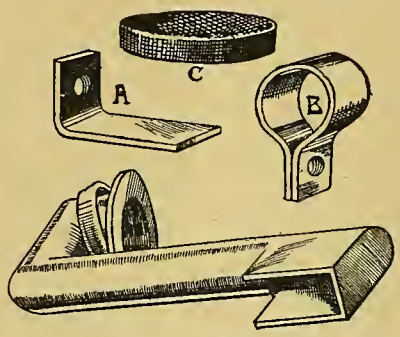
THE same correspondent invites me to pronounce on the respective merits of various gear box, clutch, and kick-starter designs. I do not possess sufficient technical knowledge, and I am in no urgent need of a libel action. As a simple-minded and somewhat disillusioned road user, my wants are few. Give me reliability all round; a gear control which is easily adjusted; a smooth clutch, with handle-bar control; and a kick-starter which does not break within three months nor stick on a dead centre at every other attempt to start, and I am satisfied. Whether the clutch is in the gear box or not I do not care a tinker's cuss. But I get exceptionally annoyed if it takes me an hour to shunt a gear box a quarter of an inch when a chain stretches; or if it is a very tricky job to recouple the controls accurately after shunting the gear box; or if the clutch reminds me of a steam tram crossing worn points; or if the kick-starter shears its teeth once a month.

A WAR TIME NECESSITY.

How a Lea-Francis was adapted to the Use of Heavy Fuel.

HAVING, like many others, fallen a victim of the Petrol Control Committee last August, I set to work to adapt my 1914 3¼ h.p. twin Lea-Francis to war conditions of motor cycling. In this particular instance it was a case of the old axiom, "Necessity is the mother of invention," for, simultaneously with the Petrol Control Committee planning out my allowance, I myself had planned a fortnight's holiday. These two schemes were not destined to work at all nicely together; and, as I had planned to ride from Glasgow to Liverpool, to tour North Wales, and then return, I soon arrived at the conclusion something must be done quickly to adapt my machine for heavy fuel. The first thing was to turn up my back numbers of *The Motor Cycle*, and here I got much valuable information on the subject.

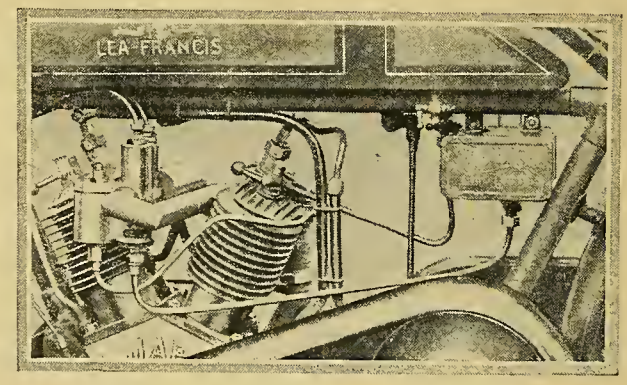
My machine was fitted with an Amac single lever carburetter, but I discarded this and fitted a Binks three-jet instrument, which I thought to be an ideal carburetter for the job, and this proved to be the case.



A, one of the four brass supports for spare petrol tank; B, clips for the tank tube; C, brass gauze "cupped," twenty-four meshes per inch, to be placed in the induction pipe. Lower sketch is the brass tubing for conveying hot air from the cylinders.

Vaporising the Fuel.

The hot air supply was first taken in hand. This was accomplished in a very neat and quick manner by taking a piece of thin brass tubing of suitable bore and cutting off three lengths at 45° and soldering together to give two right angle bends, as shown in the illustration. At the end which fits the carburetter a ring was soldered, by which the pipe is fastened to the carburetter with the screwed ring which originally held the gauze in position. The opposite end of the tube was slit longitudinally for about 2in., and the tube opened out as shown, the end being closed with a piece of sheet brass. This fits snugly between the fins at the front of the rear cylinder. When tested, it was found to act splendidly, and a big improvement was observed in the running.



From the sprocket side. A good general view of the contrivance, which is neat and unobtrusive.

Primarily, I lagged the outside by binding with asbestos cord, but afterwards I discarded this because it gave no appreciable improvement—due probably to the protected position of the tube—and made the job appear rather untidy.

Three pieces of brass gauze about twenty-four meshes to the inch were placed in the induction pipe—one at the junction of the carburetter and inlet pipe and one at each union of the induction pipe and cylinders. The latter are, of course, kept hot by the heat conducted from the cylinders. I "cupped" the gauze, as shown in sketch, and I found this held it quite safely, it being a springing fit for the tube.

The Spare Petrol Tank.

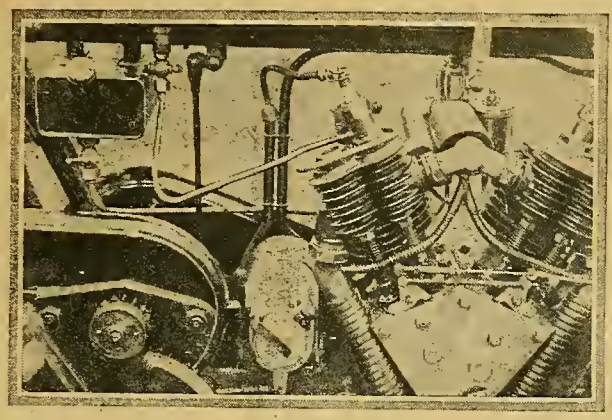
The next job was the inevitable spare petrol tank, and the first thing to be settled was the tank itself. After much hunting about the house and garage, the final choice lay between an empty quart oil tin and a large size cocoa tin. The latter proved to be the unfortunate one in this instance, and it was well soldered at all the joints to make it thoroughly petrol tight.

The next question was where to fit it, and this required some little thought. On the top tube was the obvious place, but here it seemed to mar the appearance of the machine, and eventually it was slung from the underside of the tank tube directly over the gear box. The method of suspension is shown in the sketches. A piece of brass strip was obtained $\frac{5}{8}$in. wide by $\frac{1}{16}$in. thick, and from this were bent four right-angle pieces with $\frac{3}{16}$in. holes in one side, as shown at A. These were well soldered back to back on the top of the tank, a space of $\frac{1}{8}$in. being left between the backs. Two longer pieces of the strip were taken and bent round the tank tube B, with sufficient of the ends projecting to go between the pieces soldered on the tank, and were drilled to corre-

A War Time Necessity.—

spond with the holes already in these pieces. Two $\frac{3}{16}$in. bolts and nuts and some black enamel completed the job. I was rather doubtful when I had finished it whether it would be strong enough, but hard riding for six months has removed all doubt, as it has never been touched since first fitted. The filler consists of a piece of the same tube as used for the hot air intake, soldered at 45° to the side of the tank, an ordinary cork acting as a simple and efficient stopper. The usual petrol tap and pipe were fitted, and the tank is practically invisible when I am on the machine.

My first arrangement was to use a T-piece and to conduct the petrol to the carburetter *via* the float chamber for starting. This, I found, had the disadvantage that before the petrol could reach the jets it had to displace all the heavy fuel from the float chamber and passages to the jets, which was wasteful and took a little time. I overcame this in a very simple way by connecting the heavy fuel to the float chamber in the usual way, but taking the petrol directly to the jets without touching the heavy fuel in the float chamber. The bottom cap under the jets was drilled and a union fitted, the petrol pipe going from this to the small tank. The latter, being just a few inches above the jets, gave a nice flow of petrol for starting, and it worked very successfully.



Valve side of the Lea-Francis fitted for the use of heavy fuel. The spare petrol supply is neatly tucked away beneath the rear of the main tank.

A Hot Induction Pipe.

Undoubtedly the main thing in the successful application of the heavy fuel is to supply sufficient heat for vaporisation. Thinking that an increase of temperature of my induction pipe might be beneficial, I set to work to provide the necessary heat by utilising the exhaust gases in a jacket surrounding the stump of the induction pipe and carburetter. The construction of a respectable-looking jacket in the restricted space available did not prove so easy as was at first anticipated, as it had to be built on to the induction pipe, and everything seemed as if the latter had been designed to prevent this.

However, with the dexterous use of a pair of shears and a soldering iron quite an efficient article was made. It consists of three pieces, two ends and an outer shell, and is made from tin plate. The ends were first cut and then slipped on the carburetter and induction pipe stump, the carburetter then being fastened to the induction pipe. The outer shell was bent round and soldered to each end, a few holes being bored in the one end at the carburetter for the exit of the exhaust gases.

The gases are brought from the exhaust pipes as they leave the cylinders. On the Lea-Francis flexible metallic tubing is used for the exhaust, the tubing having cast iron ends, and these ends are bored with ½in. holes to receive short pieces of iron tube, which are brazed in position. Pieces of flexible metallic tubing just slip into the ends of these tubes and convey the hot gases to a Y-piece, one limb of which is soldered into the bottom of the jacket. The Y-piece is made from brass tube, and the flexible metallic tubing just slips into the ends, no fastening of any description being used. This admits of the tubes being detached quickly, and thus easily kept clean and free from carbon. A good flow of hot gas is obtained when running, and the exterior of the jacket becomes quite hot, thus warming up the induction pipe and carburetter, and not only aiding vaporisation, but also preventing condensation.

Finally, to complete the arrangement, the fuel itself was heated; a longer fuel pipe was obtained and bent round the top of the back cylinder, as shown in the photograph. This, I think, is an advantage, as when heated the fuel vaporises much more easily. If more heat is desired the tube can be laid between the two top fins of the cylinder, but this I found to be rather excessive except when using pure paraffin, as it caused vapour locks in the pipe. With the tube in its present position the fuel and float chamber become nicely warm under running conditions.

Anyone with an aptitude for "tinkering" and who is handy with tools can with little expense adapt a machine for heavy fuel in the manner described above, and thus become practically independent of petrol.

Finally, I might add that all the fitments have now been well tried, having been in continuous use for over six months, working most successfully without giving any trouble, and proving to be well worth the energy expended in fitting. R.

TEN YEARS AGO.

A READER asks on March 16th, 1907, Who will be the first manufacturer to produce a 3½ h.p. motor cycle with spring forks, magneto, change-speed gear, first-class tyres, and all up-to-date improvements, including essential "extras," for £25? It is a long time coming. At that date a discussion was proceeding on the subject of belt *v.* chain transmission, which is still a topic of debate.

In the same issue it was stated that an £80 entrance fee was required from all competitors entering the Pekin-Paris "drive" of 8,750 miles. The Contal and Werner were the only motor cycle entries up to the time of the announcement.

The question as to whether deafness should be a bar to a man obtaining a driving licence was to the front at that time—even as it is to-day.

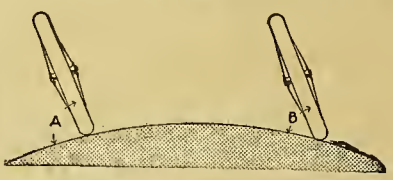
AVOIDING SKIDS.

THE CAUSES OF SIDESLIP AND HOW THEY MAY BE MINIMISED.

MOTOR cyclists use their machines in all weathers, no matter how bad the roads may be. This is especially true of our gallant despatch riders whose duties are so urgent that they brook no delay. A few hints which may enable riders to avoid sideslip will, therefore, not be out of place.

The three great factors in skidding are, firstly and foremost, the nerves of the rider; secondly, the natural stability of the machine, or in some machines the lack of it; and lastly, the surface of the road and quality of the mud. This last, of course, is beyond our control, and our efforts in the avoidance of skids must be confined to the other two headings of which the machine's shortcomings are the more easily rectified.

The bad weather stability of a two-wheeled single track vehicle, as a motor cycle, is solely dependent upon weight distribution, relatively to the front and rear wheels. In most modern machines this important subject has had full attention from the makers, except in one or two cases where it would seem that the designers are either riders of the butterfly type or possess the ability to hold up any machine on any surface, as do a few who served their novitiate on the high-framed monstrosities of nine or ten years ago.



Angles of wheels on a cambered road, showing how the tendency to skid is accentuated when a corner is taken wide.

Distorted Frames.

The owner of a machine found wanting in the matter of stability should first look to his frame, more especially so if he bought the machine second-hand and does not know its past history. It may have been pulling a heavy sidecar badly lined up, previous to coming into his hands, in which case the frame is almost sure to be distorted, very slightly perhaps, but nevertheless sufficient to throw one of the wheels out of its vertical plane and also, possibly, its track. The most likely point of distortion is the front forks, and where these are faulty the wheel will be noticeably out of centre. Unless the owner is an experienced mechanic, in which case he will need no advice, it will be necessary to send the job to a reliable firm specialising in this class of work.

Bearing Adjustment.

Make sure the wheel bearings are properly adjusted, and should it be found impossible to take up the play in either wheel, renew the cone at once, as these little items are cheaper than skids, and the trouble of fitting is time well spent. While examining the bearings see that the rear wheel has not been pulled over by the transmission, as sometimes happens on chain-driven machines possessing a weak design of adjustment to the rear chain. Wheels, if badly out of truth, must be trued up, but a slight failing in this respect may be ignored, as most rims suffer more or less in a season's use. Play in the steering head must be corrected, as the nucleus of a wobble, which finally develops into a side-slip, may be frequently traced to this cause. In tightening the head take care that the steering is not left too stiff, since such a state of affairs makes the correction of a skid a very difficult matter.

A low saddle position is essential to steadiness, and if the owner intends keeping his mount for, say, two seasons, the cutting down of a high frame is well worth the expense incurred. The substitution of T.T. bars in place of the more comfortable upturned type will often work wonders as regards control on grease. Their superiority lies in the fact that one's weight is supported more or less equally between the front and rear wheels, and the use of the bottom bracket footrests, in place of the forward pair, creates a feeling of greater confidence in one's ability to correct a slip if necessary.

Belt-driven machines, as a rule, show less tendency towards skidding than chain-driven types, while two-strokes and small twins are superior to single-cylinders. It must not be inferred that a hard and fast rule may be drawn between types which skid and those that do not. There are several riders of chain-driven single-cylinders who have never had a side-slip, and, on the other hand, a skid on a light two-stroke is not a thing unheard of; but in these instances the personal element undoubtedly counts for a great deal.

How to Ride.

The nerves of the rider, as previously asserted, play an important part in the determination as to whether or not the machine retains the vertical on a slippery road. We all know the man who can ride over tramlines thick with grease at a reckless rate on a thumping single without mishap, and also the nervous rider who crawls along on a two-stroke with feet astride slithering all over the road. The majority of us probably are in a class midway between the two.

It is a great mistake to proceed with eyes glued to the front wheel—a habit with some—on a treacherous surface. Look straight ahead, hold the body loosely, and let the grip on the handle-bars be just sufficiently firm to convince one that one is master of the machine, without keeping the muscles of the hand unduly taut. Endeavour to ride as though the mud were non-existent and avoid sudden swerves. While the machine is proceeding steadily in a straight line a skid is practically impossible, but immediately the direction is changed several conflicting *forces* are set up and the chances of slip increased tenfold. A speed of about fifteen miles per hour will be found the safest for the average

Avoiding Skids.—

rider. On a soft surface the unforeseen necessity for sudden braking at anything above this speed is sure to end in disaster, and a careful driver should be always in a position to pull up fairly quickly should emergency demand. Slithering the feet along the ground is unquestionably asking for trouble.

The Use of the Brakes.

It should be superfluous to state that braking is undesirable on a slippery surface. If you must brake, apply the rear one very carefully and release immediately the wheel is felt to lose its grip of the road. On no account make use of the front fitment. It is decidedly preferable to lock the back wheel and

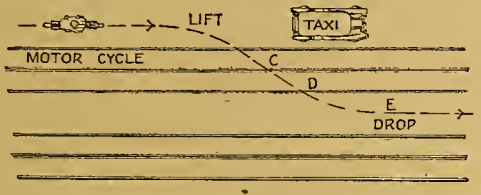


Diagram showing where to lift and release the exhaust valve lifter when crossing greasy tramlines.

experience a skid than to risk a spill from the front wheel brake. A back wheel skid is to a certain extent protracted and controllable, but that from the front wheel is unpleasantly sudden and utterly ungovernable, permitting the unfortunate rider no time to select a soft spot on which to fall. Tramlines are undoubtedly responsible for seventy per cent. of a motor cyclist's spills, and those with a centre rail between stone setts are the worst offenders. When slow traffic forces one on to this portion of the road the clutch should be slipped while actually crossing the metals. On a bicycle minus a clutch the exhaust lifter may be used provided it is not dropped until the original direction of travel is resumed.

Roads and Tyres.

Stone setts and wood blocks if coated with a layer of churned-up mud will instill misgivings in the best of us, but so long as violent changes of direction can be avoided a safe passage is assured. A wet surface, as distinct from thick mud, need occasion little anxiety, as the wheels are in no way prevented from obtaining a good grip on the road.

As regards tyres, we have one set of riders who maintain that the tyres should he soft in order to have a large effective gripping surface, and their opponents who aver that a hard tyre obtains a better grip on account of its cutting through the mud to the road beneath. The writer compromises by leaving the rear one at its normal inflation and letting down the front ever so slightly when mud plugging has to be done, and his side-slips, recently at any rate, have been comparatively few.

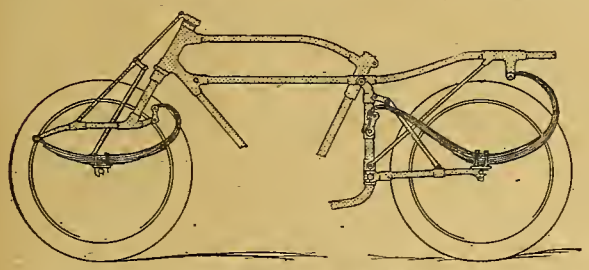
It is hoped that no self-respecting motor cyclist will take out a pillion passenger in muddy weather, but should he be overtaken by a storm and find it necessary to return over roads in a greasy condition, he must insist upon the passenger sitting close up, and, having adopted a comfortable position, refraining from any changes whatever without warning to the pilot.

CLUCATOS.

TWO MORE SPRING FRAMES.

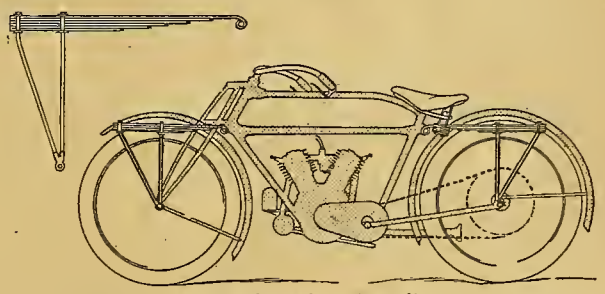
Bringing the Number of Designs reviewed subsequent to our Campaign to Ninety.

TWO more spring frame designs must be added to those published in *The Motor Cycle*—already a long list. The first is the invention of Mr. C. T. Stone, of Caerphilly, near Cardiff, and briefly it consists in prolonging a double tube, which passes from the tread below the tank, to the rear in the form of a carrier. This extension, strengthened by means of light tubes and supported by curved leaf springs, carries the weight of the rear part of the machine. The springs are capable of swivelling at the rear axle, and their forward ends are supported



A Welsh design of spring frame.

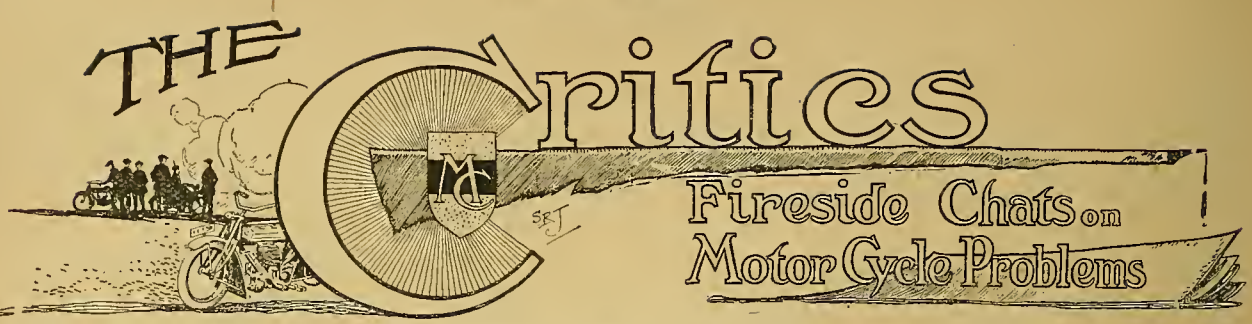
by shackles attached to the rearmost of the two down tubes from the saddle. The front forks are not covered by the patent (No. 102,392, 1916), and are self-explanatory.



A spring frame from Australia.

The second design has been sent to us from Newcastle, N.S.W., Australia, by Mr. W. G. Shellshear, M.B. The springs, which are, of course, in pairs, are carried by triangulated pieces attached to the axles, thus the springing is from the wheels to the frame instead of *vice versa* as usual. The inventor tells us that he has tried the springing on the front wheel and finds the extra weight on the wheel an advantage rather than not. The springing depends, of course, upon lessening the angle between the points A and B.

The rear parts of both these frames appear to us to be somewhat lacking in lateral rigidity as at present shown, but this fault may be overcome in the final designs.



THE fire was comforting. Silence reigned within. The Manufacturer was dosing. The D.R. was dreaming of peace, abundant petrol, and—other things. The Journalist, obsessed by thoughts of heavy fuels, was wondering whether he could run his fountain pen more economically on Jeyes fluid than on ink.

"*I* think," announced the Novice with disquieting suddenness, "that manufacturers ought to wake up."

The member of the trade sat up with a start.

"Take the size of wheels as an example," pursued the Novice, with the supercilious confidence begotten of second-hand information. "Why not heed the insistent appeals of practical riders for 28in. × 3in. wheels and tyres? It does not necessitate altering plant. It would fill a long felt want—especially Overseas. It could be done without demur or delay. Why not, then?" And the Novice stroked his waistcoat with the confidence of a city mayor who has just announced that the drains were bad—a fact painfully evident to everyone.

"What makes you think that these huge wheels and tyres are preferable?" demanded the Manufacturer, by way of a cross-question.

With mayoral confidence the Novice expanded amidship. "Ask any man who has ridden a big Yank!" was his simple retort. "To-day I was nearly shaken to death over the pot-holes——"

Large Wheels for Large Machines.

"Just so! Exactly! Precisely what I knew you would say," stated the Manufacturer triumphantly. "The big Yank—certainly, because the 28in. × 3in. is essentially the tyre for a heavy, powerful machine. But we are not talking about big Yanks. You refer to the moderate British production, and I can give you several reasons why the British manufacturer jibs at 28in. × 3in. wheels and tyres. To begin with, they are apt to skid abominably on bad roads, which is easy to understand. Immediately the pattern has disappeared from the tread, the tyre presents merely a large, flabby surface to the road, which does not cut through the grease."

"My experience is that, with these large wheels, one does not wear out the tread," said the D.R. "The tyre goes at the skirt, or is ruined by cuts before the tread is worn out."

"That depends entirely on the nature of one's riding," replied the Manufacturer. "I guarantee that if you take a dozen Indians on the road you will find at least nine of them with treads worn to the skidding point—canvas still perfect. There are other points. Firstly, everyone demands a low price machine, and 28×3in. tyres add considerably to the cost——"

"Initial cost, yes," drawled the Journalist. "But at the end of the year the 28in. wheel is the cheaper. Go on. Turn the shells out."

"Secondly," pursued the Manufacturer of Munitions, "you want to be able to obtain a cover anywhere. You cannot do this if 28×3in. is your size."

"Ye gods!" interposed the D.R.; "but you would be able to if that size became commonly used, which is what we suggest. Let's have the heavy artillery."

The Shell Maker held up a restraining hand. "All right," he agreed. He turned to the Journalist. "Have any of you any considerable experience of 28×3in. tyres?"

The Journalist removed his pipe, and looked somewhat cornered. "Yes," he confessed, rather reluctantly. "I can't say that I was particularly struck by the 28×3in."

"Why not?" It was one of those simple questions that demand an adequate answer.

Several reasons. Ridden at moderate speeds, and when in a flabby condition, it is topping, but in the trials we had to blind over narrow roads at any speed up to sixty. Doing this on a 3in. tyre, one is haunted by the thought that the tyre might puncture or pull off the rim, which would probably mean a head-first collision with one of the adjacent walls. The 3in. section is ideal for pottering over bad roads, but it is a nightmare for speed work over narrow, hard surfaces. If it goes down suddenly, it is just like a boiled pudding between the hard rim and the hard road. The sensation is frightening. I had it happen once, but I hope never again."

"Just my point," announced the Manufacturer. "You imagine the beginner experiencing the fright of a flat 28×3in. tyre on a solo mount! Why, it would frighten him off the make for at least a year, and in the meantime he would have purchased something else. Now"—the Manufacturer turned again to the Journalist—"what about skidding?"

Ideal in Certain Cases.

But the man of letters was not to be drawn. "I have stated," he said, "that the 28×3in. is ideal for rural pottering. The worse the roads, the more necessary it becomes, but I do not consider it suitable for blinding. It is dangerous. As for skidding—what one loses on the swings one gains on the roundabouts. The large tyre skids on smooth grease, but it bridges the ruts and tramlines. On the former, side-slip is generally the result of bad judgment; on the latter it is most to be feared. Therefore I do not consider side-slip as a point to be considered."

The Manufacturer knocked out his pipe. "From this the disadvantages are obvious," he said. "We have it that the 28×3in. is certainly desirable for Overseas tracks, but that it presents dangers that practically prohibit its general adoption over here. Now, proved that it has disadvantages, can you prove that it has advantages? Is there any appreciable difference between the machine fitted with 28in. wheels and the machine fitted with 26in.?"

"Yes," said the Journalist.

"If there is the same difference between the 28 and the 26 as there is between the 26 and the 24, I'm all for the 28," answered the D.R. "I am riding a lightweight for business purposes which is quite spoilt by 24in. wheels."

"Just about the same difference," announced the Journalist.

But the Manufacturer had one more shell to fire. "Your speedy T.T. mount would prove sluggish if fitted with 28×3in.," he announced. "If we adopted this size, I am half of the opinion that, though there would be a tremendous rush on it the first year, it would fall dead the second year."

Large Circumference Urged.

The Journalist waited for the lull, then he said: "Our conversation has centred round 28×3in., and what I wish to point out is that the objections raised are against the large, flabby tyre, not against the large wheel. There is obviously much to be gained by large wheels. They bridge the pot-holes, and tend generally to more comfortable riding. But the large tyre does not entirely fill the bill over here, so why not compromise by fitting 28in. wheels with 2½in. tyres?

"Speaking from practical experience, I consider the 28×2½in. tyre the best solution. It possesses the advantages of the large wheel without the disadvantages of the deep section tyre. Therefore I say the 28×3in. for Overseas, the 28×2½in. for the British Isles," and the Journalist sniffed loudly, which means, in Sioux parlance, "I have spoken."

Here we arrive at what fiction writers call a "dramatic crisis." This is where the Manufacturer should have shown up in an heroic light. It required much skill on his part to circumvent the Journalist's latter statement—so much skill, indeed, that he quietly gave it up, and so we must leave the reader to fill in his own happy ending.

A.C.U. ANNUAL REPORT.

FOR two years the activities of the Auto Cycle Union have been devoted to such national service as has been found possible and the protection of the interests of its members rather than to its main object in peace time—the encouragement of motor cycling. During last year 700 members took advantage of the concession by which they could, if on service, become honorary members. The fourteenth annual report, issued last week, goes on to state that there is evidence of increased activity among motor cycle organisations in our Overseas Dominions, and that after the war it is hoped that the A.C.U. may become more than ever both a national and imperial union of motor cycle organisations.

An Appeal.

The end of 1916 leaves the Union in a position to meet all liabilities out of liquid assets (that is to say, apart from stock or the reserve account) and still to have a balance in hand. But, in spite of that, the coming year is faced with a certain amount of misgiving. An earnest appeal is therefore addressed to all members to assist the Union by renewing their subscriptions promptly, and by obtaining new members amongst their motor cycling friends, and by recommending the Auto Cycle Union Insurance Policy.

The possibility of further taxation and other matters affecting motor cyclists, makes it imperative that the Union should remain financially and numerically the most important body solely representing motor cyclists in the United Kingdom.

"————?"

Suggestions for a Title.

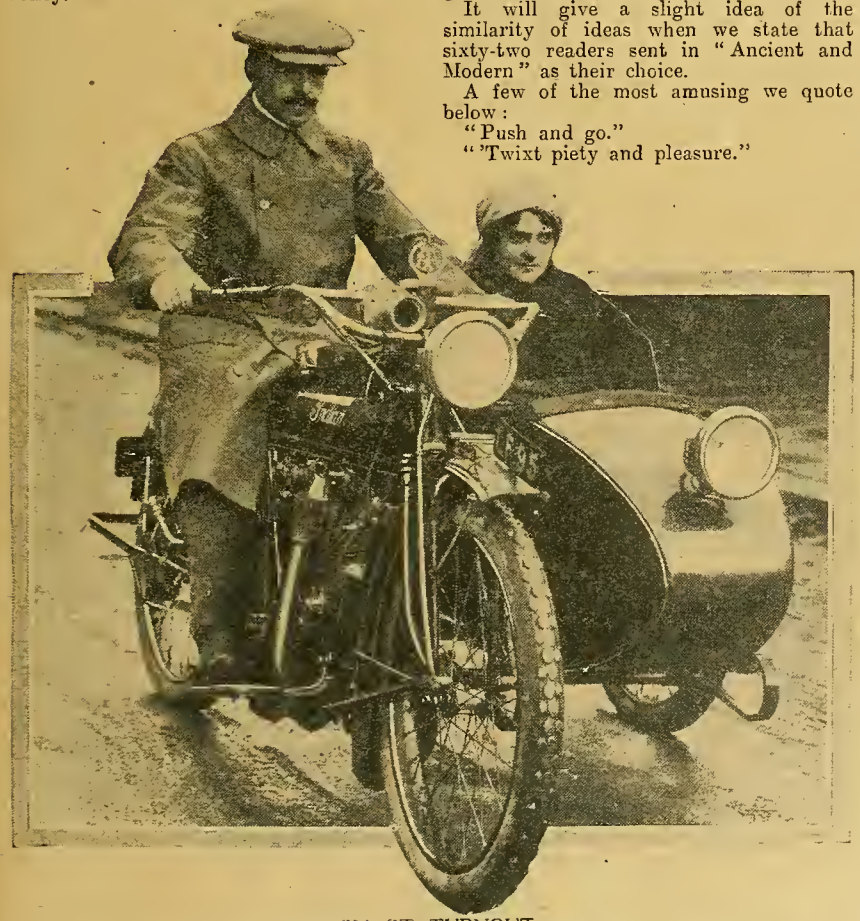
OUR simple invitation for an applicable title for a photograph brought hundreds of suggestions. We offered a copy of the new edition of "Motor Cycles and How to Manage Them" for the most suitable title, but deem three suggestions so deserving that we have sent a copy each to J. E. Newton, 62, Chapel Street, Penzance, whose title was "Petrol Committee views its handiwork" (owner has dropped dead on hearing "no more petrol"); G. W. Hester, 253, Mare Street, Hackney, N.E., "Gone to renew his licence, silly ass"; J. E. Thompson, 86, Watson Street, Hartlepool, Co. Durham, "C3 *versus* A1."

Several good titles were sent in practically identical in their wording. The petrol situation caused many to give vent to subtle innuendos concerning the Petrol Control Committee, which are generally good humoured, though sarcastic.

It will give a slight idea of the similarity of ideas when we state that sixty-two readers sent in "Ancient and Modern" as their choice.

A few of the most amusing we quote below:

"Push and go."
"'Twixt piety and pleasure."
"Eclipsed."
"Dourness and flexibility."
"Nothing doing."
"His perplexing rival."
"Kick-starters."
"Aspirations" (ass-spire-ations).
"What is it master likes so much" (apologies to Reid's stout)?
"Amity."
"A great thinker and a great doer."
"Wanting assistance."
"Balaam's new ass."
"Oh, what an ass I am."
"Foolproof."
"Alpha and Omega."
"Chacun tire de son cote" (Each pulls his own way).
"His master's v(o)ice."
"Everybody is using them but me—I'm an ass."
"Waiting and seeing."
"Pons asinorum. He *can't* get over it."
"Jack in wonderland."
"Two trusty sweaters."
"Brayhard and Bradbury."
"The other one has gone to pay his revenue."
"And who was your mother, Mr. Bradbury?"
"You're as fleet as any horse can be, and as dogged as a mule, but as stubborn as a donkey if your master is a fool." (The Kipling in embryo.)
"Ah! our spirits fail us."
"Tired and tyred."
"Riderless steeds."
"Anyway, I don't skid."
"Quietists: Waiting for the spirit to move them."



A SMART TURNOUT.

Mr. Ernest Ashford Bridgman (hitherto known by his stage name, Ernest Frasetti) with Miss Lottie Berend aboard a 7 h.p. Indian sidecar outfit. Mr. Bridgman is assistant manager of the London depot of the Hendee Manufacturing Co.

LECTURE ON AIR-SCREWS.

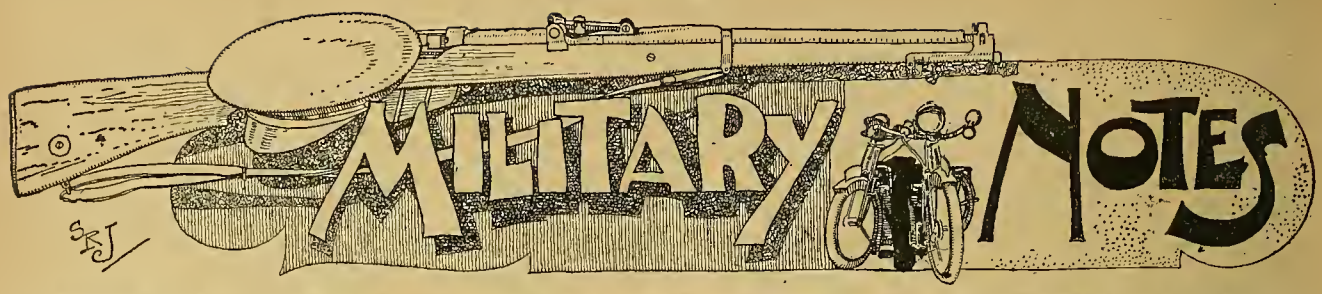
THE sixth general meeting of the session of the Institution of Automobile Engineers will be held in the Hall of the Royal Society of Arts, John Street, Adelphi, W.C., on Wednesday, March 14th, 1917, at 8 p.m., when Mr. J. Lawrence Hodgson, B.Bc., A.M.Inst.C.E., will read two papers on "Air Screws." Cards of admission are to be obtained at 28, Victoria Street, London, S.W.

Daimler Premium for Graduates.

An annual premium of £25 has been placed at the disposal of the Council of the Institution of Automobile Engineers by the Daimler Co., Ltd., and will be awarded to the graduate who submits the best paper on an appropriate subject in any session. This award is not intended primarily as a reward for original work, but rather as an encouragement to graduates to cultivate qualities that will be of practical use in their daily life.

THE REGISTRATION OF NAMES.

MR. ERNEST FRASETTI is well-known to all our readers as the assistant manager of the Hendee Manufacturing Co. (London Depot), and late of the music hall stage. The name Frasetti is his stage name, but as he became known under this name not only on the stage but as a trials rider, the name was retained. However, under the Registration of Business Names Act it now becomes necessary that he should be known by his legal name, which is Ernest Ashford Bridgman, and his friends are asked to note this fact.



FROM THE "GAZETTE."

TEMPORARY-LT. B. O. BARTON, formerly of the Spencer-Moulton Tyre Co., Ltd., and a member of the Public Schools M.C.C., has been promoted to the rank of temporary captain.

WOOLWICH MOTOR CYCLIST AS MOTOR BOATMAN.

FRANK WHITAKER, a member of the Woolwich and District Motor Club, has joined the Motor Boat Patrol. He is a well known rider and steersman of the Enfield first-aid fire outfit employed by Green Street Green, Kent, Volunteer Fire Brigade. Whitaker is now a chief motor mechanic.

Frank Whitaker, chief mechanic in the Motor Boat Patrol.

MOTOR DRIVERS IN THE INFANTRY.

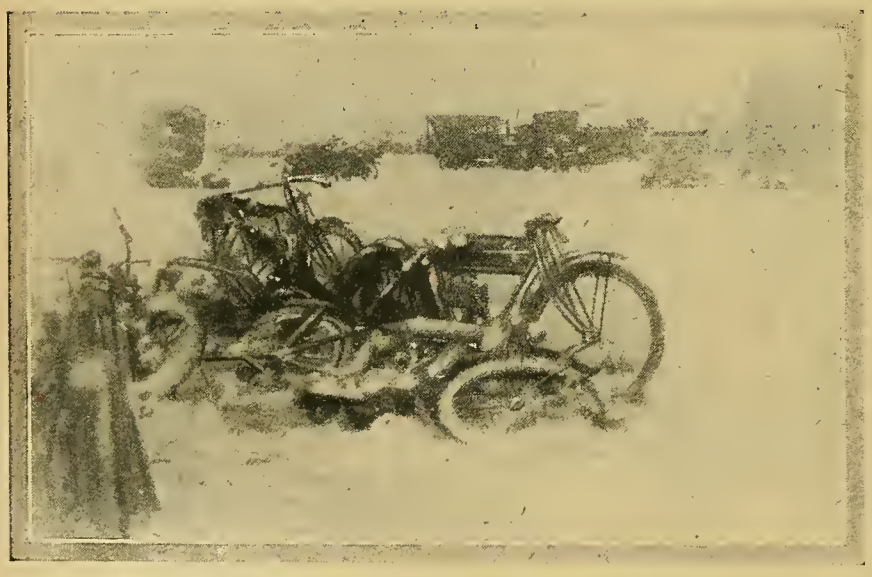
CONCERNING the leading article in our issue of February 22nd, on the subject of motor drivers of the A.S.C., M.T., recently transferred to the infantry, we are informed by some of the men affected that married men as well as single, and old recruits as well as new recruits, are included among the transfers. Their pay, it is added, has been cut down to infantry scale.

A MOTORIST'S PROMOTIONS.

CAPT. HERBERT BALE, A.S.C., M.T., the stalwart son of Mr. F. B. Bale, was last week gazetted a major, which promotion brings up the Swift Co.'s London Staff record to one major, two captains (one awarded the Military Cross), one lieutenant, and one D.C.M.

ROUGH USAGE FOR MILITARY MACHINES.

A GOOD many readers fondly imagine that they will some day be able to obtain a bargain in the shape of one of the motor cycles now being used by the military authorities. It seems to be the popular impression that the War Office will, ere long, release thousands for sale, that they will be disposed of by auction at absurdly low figures, and will constitute a real bargain, but we are, personally, not so sure of this. At any rate, to all who are saving up for this bargain *in embryo*, the photograph on this page will come as a shock, as it shows that even the best and latest designs of military machines are not kept under cover and looked after with the care that a private owner devotes to his machine. The picture incidentally explains the rapid deterioration in the appearance and value of a military mount. It is a pity that a motor cycle is not a suitable mount for the transport of a tarpaulin which could be used to protect the machine from the elements, particularly in rough wintry weather. Buildings or sheds to provide shelter for motor vehicles are not favoured in the zones of war.



NOT DERELICTS—BUT 1916 MILITARY MODELS.
War battered machines half buried in the recent snows.

HELMETS FOR NIGHT RIDING.

FROM G. W. Taplin, of the 22nd K.B.S., R.F.C., we have received the following interesting notes: "We have had some hard times during the recent cold weather, and until the woollen helmet was obtained it was almost impossible to ride a motor cycle for more than five minutes without stopping to warm one's ears, and if the English ladies would make them instead of mittens it would be a godsend to their soldier friends. They would be specially useful at night in the draughty hen roosts called billets.

G. W. Taplin, R.F.C. motor cyclist.

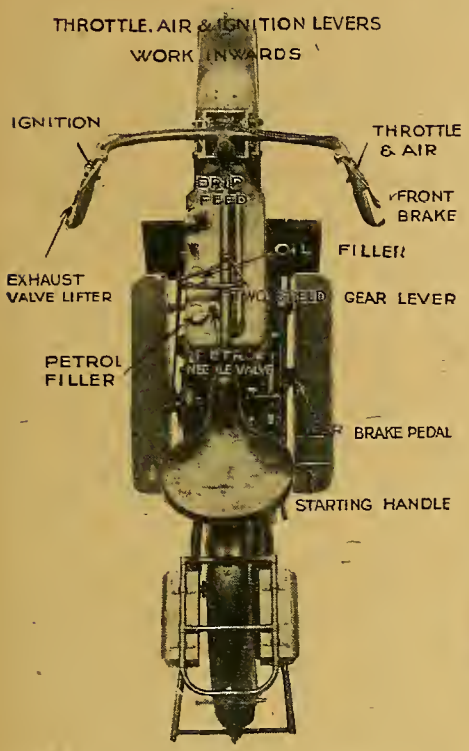
"The grumblers at the pot-holes in England ought to see the roads out here since the frost. They have turned completely over, and the chalk that is usually found a foot underneath has now climbed to the surface, and lies in big lumps, making it almost impossible to ride.

"The way the P. and M. sticks it is marvellous, and the tales I could tell you of what it has cheerfully done would make a good many other bicycles I could mention shake to pieces with fright, and get a Blighty touch the first journey.

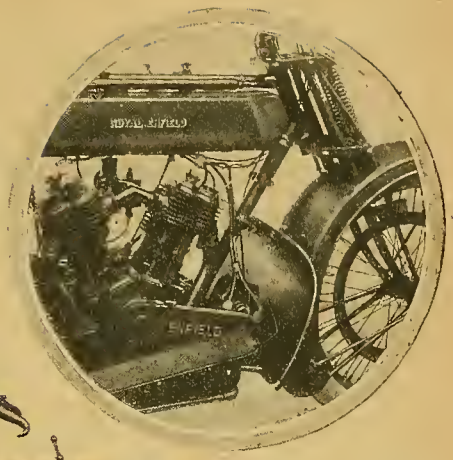
"The biggest surprise I have had is the Kempshall tyre; although only known to me by name in pre-war days, it has proved itself (out of the many varieties I have had issued) to be the best of the lot, some having given up the ghost in a day or two.

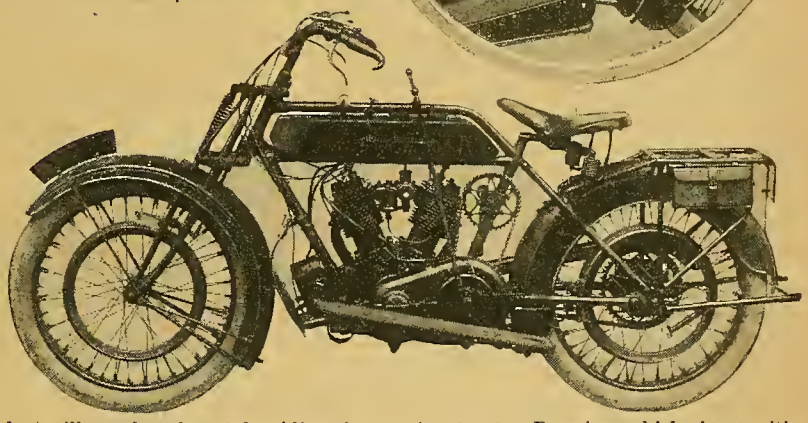
"I might add, in conclusion, that I look forward regularly to the arrival of *The Motor Cycle* and *The Light Car* each week, and after I have done with them there is a scramble for their possession by others in the camp. I must thank you for the two most interesting and instructive of motor journals."

THE ENFIELD RUSSIAN MILITARY MODEL.



The model illustrated is of 6 h.p., but 8 h.p. machines of similar design are being supplied for sidecar work. Special points of interest are: A ground clearance of 6in., semi-T.T. pattern handle-bars, the finish in service green, and a new magneto shield of liberal dimensions. The air throttle and ignition levers all work inwards, with their cables outside the handle-bars.





AMERICA'S USES FOR MOTOR CYCLISTS.

WE observe from *The Motor Cycle Illustrated*, of New York, that, in the face of an open break with Germany, with all its possibilities for trouble both from without and within the American borders, American military leaders addressed to motor cycle mounted guardsmen their first call for aid. The first Motor Battery of the 22nd Engineers was summoned together by motor cycle courier. Just two hours later, in detachments of ten men each, the one hundred expert motor cycle mounted soldiers were patrolling the whole of the New York City Aqueduct, with communication stations established at the big gatehouses along the line. Other work for American military motor cyclists was the mustering of the Motor Cycle Division of the First Field Artillery for despatch riding between Divisional Headquarters and other Commands located at various parts of New York City. We read that the incessant activity of these speedy motor cyclists throughout the day gave Upper Broadway its first taste of the things that are to come.

A group of motor machine gunners who joined the service through *The Motor Cycle*. All are now with the Heavy Section, M.G.C., and their names from left to right are: Gnrs. Dowse, Bullivant, Willis, and Belton.

MOTOR CYCLES FOR NEWSPAPER DELIVERY.

A MONTH ago a photograph of M. E. Taymans, late secretary Brussels M.C., and who is now a military motor cyclist attached to the Belgian Legation at Havre, appeared in these columns.

It is interesting to note that since the photograph appeared, M. Taymans's wife has taken up motor cycling for a living. She rides every day about thirty miles in two journeys on a 2½ h.p. F.N. motor bicycle fitted with a home-made sidecarrier, and sells the *Daily Mail* to the men of the Canadian Camp at Rouelles. We are told she can easily beat youngsters of about seventeen years of age on push bicycles.

This is another example of the infinite usefulness of the motor cycle.

Madame Taymans rides without any spares but a plug and a valve. She finds the little 2½ h.p. F.N. very reliable, but not quite as powerful as could be desired for the difficult road conditions. How Monsieur and Madame Taymans long for the trusty Premier which is awaiting them in Brussels! And, they add, any 3½ h.p. English three-speed mount would be a blessing. M. Taymans made the sidecarrier and painted it himself in his spare time. He has fitted a steel bar of about 25 lb. weight near the sidecarrier wheel to prevent the latter lifting too easily.

Madame Taymans, of Havre, and her 2½ h.p. F.N. sidecarrier.

THOSE QUIVERING PISTONS!

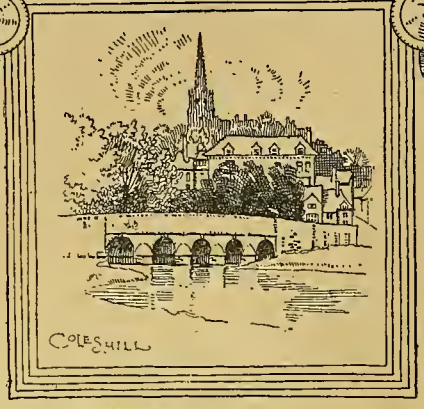
M. PAUL BIRAULT, Editor of the official organ of the French Army, says of the "Tanks": "I had the opportunity of seeing a Tank that had just been landed and whose mechanics were busy adjusting the motor. . . The inside is a perfect mechanical gem. One has only to look at the brightly polished steel and copper parts, the cylinders and quivering pistons, to see that the strength of the monster is throughout the work of intelligence."

CURRENT CHAT

Time to Light Lamps

GREENWICH TIME.

Mar.	8th	... ...	6.19 p.m.
,,	10th	... ...	6.23 ,,
,,	12th	... ...	6.26 ,,
,,	14th	... ...	6.30 ,,



Special Features

A WAR-TIME NECESSITY.

AVOIDING SKIDS.

"THE CRITICS" ON 26in. v. 28in. WHEELS.

"The Motor Cycle"—Twopence.

A fortnight hence the price of *The Motor Cycle* will be increased to twopence per copy (its original price) in order to maintain its present standard.

Rise in Price of Tyres.

Last week there was an increase in the cost of tyres. A pair of 650×65 mm. tyres complete of a leading make was advanced from 103/- to 117/-.

New Points in an Old Topic.

The interesting and important matter discussed by the Critics in this issue has many sides, and no doubt some of the points brought forward will open up new lines of enquiry in the minds of many of our readers.

A.C.U. General Meeting.

The annual general meeting of the Union, at which all members are entitled to be present, will be held at the Royal Automobile Club, Pall Mall, London, S.W., on March 29th, at 6 p.m. The only business to be transacted is the election of president and vice-presidents, and the reception of the annual report and balance sheet for 1916

Give a Definite Order.

In view of the further restrictions of paper, we advise readers who buy their copies of *The Motor Cycle* casually to place a definite order with their newsagent. There is sure to be still more difficulty in the coming months with respect to the supply of paper, and much disappointment would be avoided by the above simple procedure.

The Second-hand Market.

Our list of average prices indicates that the second-hand market remains pretty much awake in spite of petrol restrictions. This state of affairs is owing to the enormous number of machines used on national work of one kind and another, and there is no doubt that as time goes on the demand for cheap and rapid means of mechanical transport will remain steady

Analysis of a Substitute.

In view of the number of petrol substitutes now before the public, it will interest motor cyclists to know that a reader advises us that the analytical results of one of the substitutes offered to the motoring public show it to be a light petroleum lamp oil which can be bought at about half the price at an oil shop.

A Route to Avoid.

A correspondent who signs himself "LL 9695" writes us as follows: "The main road between Reading and Basingstoke is at the present time dangerous to motor cyclists, the worst part being near Swallowfield, about five miles from the former place. Two days ago I was nearly pulled up three times in a short distance by my footboards fouling the road, but luckily the sidecar saved a spill. Motorists desiring to go from Reading to Basingstoke should turn to the right just short of Three Mile Cross—three miles from Reading—going through Beech Hill, where there is a very sharp down hill left-hand turn round a public-house, and rejoining the main road at the Wellington Arms"

On Sunday last the Mayor of Coventry (Mr. Alick S. Hill) reviewed the Motor Section of the Coventry Special Constabulary. The Mayor, wearing his gold chain of office, was accompanied by the Chief Constable of the city (Mr. C. C. Charsley).

Substitutes—of the Oily Kind.

Last summer there were a score of petrol substitutes before the public. Our present list includes thirty-four names—some of them weird and wonderful.

The National War Funds.

At the week-end the principal war funds stood as follow:

The Prince of Wales's Fund (distributed £3,539,719)	£6,039,423	0	0
British Red Cross Fund	6,223,426	0	0
Tobacco Fund	126,206	0	0

Extension of Manufacturing Permit.

Manufacturers of motor cycles not engaged on Government work have had their permits to manufacture extended, but new machines may only be placed in the hands of those on work of real importance, such as doctors, farmers, etc. The importance of Overseas exports to assist our exchange is emphasised in the letter conveying the decision.

Agents to obtain Permits.

Agents in future must obtain permits to dispose of new motor cycles (and presumably cars). Formerly a manufacturer had to obtain a permit, but now a certain number of machines may be supplied to agents, and the latter must give an undertaking that they will not be sold without a permit from the Director General of Mechanical Transport.

An Amusing Suggestion.

America's latest suggestion to check excessive speed of motorists is that the vehicle should have a State-sealed box or receptacle in which should be placed cards bearing the name of the owner of the car, and his photograph and address. It is to be made so that by an ingenious automatic arrangement one of these cards should be liberated and fall on the road if a certain fixed speed were exceeded, the prosecution of the owner thus being an easy matter.

Germany Traded on our Ignorance.

In his paper, "The Magneto: Its Function, Design, and Construction," read before the Coventry Engineering Society, Mr. E. A. Watson, M.Sc., brought forward a point which illustrates how we were exploited by the German magneto manufacturer before 1914. The German policy was to recommend various sizes of magnetos for different sizes of engines—a large magneto for a large engine and a small one for a small engine. Mr. Watson was convinced that this is entirely unnecessary, and was merely a little device on the part of the Germans to profit by our ignorance, for, believing the tale, we were content to pay considerably higher prices for large magnetos.

An Early Proof.

Our sister journal *The Autocar* points out that one of the first men to explode this theory, though he had few backers, was Mr. C. R. Garrard, as at that time (eight or nine years ago) the Clement-Garrard cars were carrying everything before them in competition circles, and it was a matter of general comment and wonder that the cars were fitted with such small magnetos.

"The great point of this contention is," points out *The Autocar*, "that one size of magneto is practically suitable for any size of engine," which, of course, means much cheaper production.

Help to Conserve Supplies of Paper.

To prevent waste of paper, we would once again urge readers to order *The Motor Cycle* from a newsagent, and not purchase their copies anywhere. From the 22nd inst. the price will be 2d.

Not Hot Air, but Gas!

We are informed that somewhere in U.S.A. "Speed Cop" E. L. Heels took his 1917 Henderson, put in one gallon of gas, and rode 104½ miles. Was it acetylene gas? If so, according to the opinions of some of our readers, he might have travelled still farther.

Rudge Workers Entertain the Wounded.

On Saturday last a team of Rudge sidecars conveyed fifty-seven wounded soldiers from the Coventry and Warwickshire and Courtauld's Hospitals to the Rudge Works. A tea and entertainment had been provided by the girls working in the aeroplane factory, and the enjoyable time was thoroughly appreciated by the wounded men.

Petrol v. Substitute.

Substitutes are all the talk just now. Some riders would drop them to-morrow for ever if they could get petrol; other motor cyclists can be heard vowing that they will never pay a high price for petrol again, now that satisfactory substitutes at a reasonable figure are obtainable. It is largely a case of carburetter and the system of vaporising adopted, as we have shown by recent articles in *The Motor Cycle*.

Use of Petrol.

Enquiries continue to reach us concerning the matter of petrol permits and the use of petrol. If, therefore, readers will kindly note the following, it will save a great deal of correspondence:

A stock of petrol, on which duty has been paid, can be used after March 31st or at any time.

A petrol permit can be used after March 31st until it is exhausted.

Full duty petrol permits are not now being issued.

A small stock of petrol on which duty has been paid can be transferred to a friend without entry on his ticket.

There are to be no restrictions as regards the use of motor vehicles after March 31st.

A Temporary Membership Scheme.

The Finsbury Park Cycling and Motor Cycling Club has adopted a scheme whereby, for a nominal subscription of 2s. 6d. per annum, members of other clubs which have ceased active operations may become temporary members, entitling them to the same benefits as ordinary membership, except the power to vote at club meetings. Such membership will automatically terminate on December 31st of the year in which peace is declared.

Women Drivers Wanted.

Women motor drivers are urgently required by the Director General of the Mechanical Warfare Supply Branch of the Ministry of Munitions. The work will be in Leicester, and will consist of driving 2-3 ton motor lorries. There are certain physical specifications laid down regarding weight, height, and constitution. Applications for these positions should be made to the Chief Stores Officer, Ministry of Munitions, M.W.S. Stores, Grafton Place, Leicester.

Simple Arithmetic.

Few motor cyclists realise the marvellous rapidity with which the cycle of operations in a high speed engine are performed. An article, entitled "Some Simple Arithmetic," in Wednesday's issue of *The Light Car*, shows that in a four-cylinder engine revolving at 3,000 r.p.m. a magneto has to deliver 100 sparks a second. A twin two-stroke requires the same number of sparks at the same speed. The article gives other figures equally interesting and astonishing concerning crankshaft and piston speeds.

The French Way.

Both in peace time and war time the French are far more logical in their method of taxing road users than we are in this country. They realise that motorists are not the only people who benefit by improvements to the roads. In consequence, horse-drawn vehicles are made to pay their share in the upkeep of the highways, as privately owned carriages do in this country. To observe the damage done by horse-drawn lorries and farm vehicles during this last week, now that the roads are soft through being lifted by the frost, is proof enough that a more equitable system of taxation should be devised.

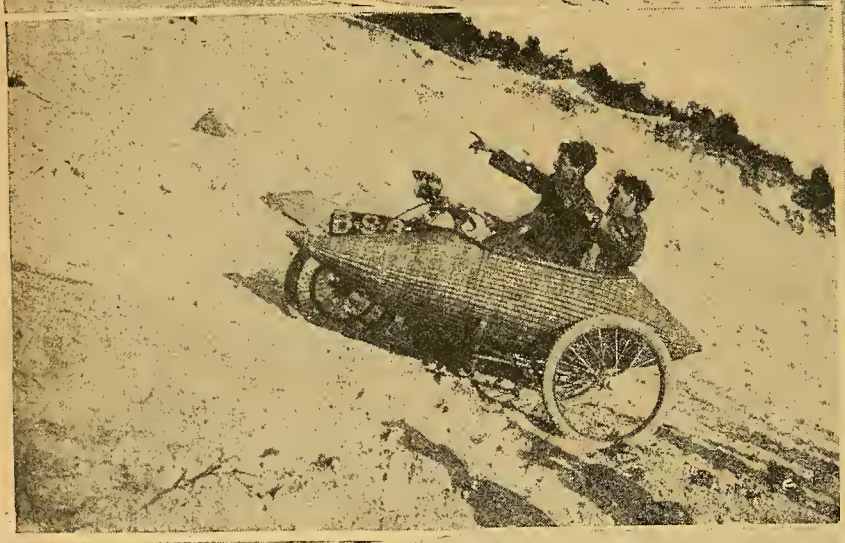
REBATE ON LICENCE FEES.

The Recommendation of "The Motor Cycle" Adopted

ON February 15th we discussed the question of the cessation of petrol licences, and strongly objected that the decision should have come immediately after the end of January, during which month licences had to be paid on motor vehicles. We asked, "Do the authorities imagine that motor cyclists are willing to pay a full year's licence for a quarter of a year's riding?" We further pointed out that the Government could not in justice retain in full the fees which had been paid this year. The attention of the A.C.U. was drawn to the matter. Many letters of support reached us from readers, and all such will be particularly interested in Mr. Bonar Law's announcement in Parliament on Monday last, the 5th inst., which is given hereunder:

> THE CHANCELLOR OF THE EXCHEQUER, replying to Mr. Doris (Mayo, W., Nat.), said he had decided to introduce a clause in the Finance Bill providing that where the owner of a private car is unable to use it owing to the restriction of the supply of motor spirit he shall, if he surrenders his motor car licence before June 30th, be entitled to repayment of one-half of the duty which he paid on taking it up. (Hear, hear.)

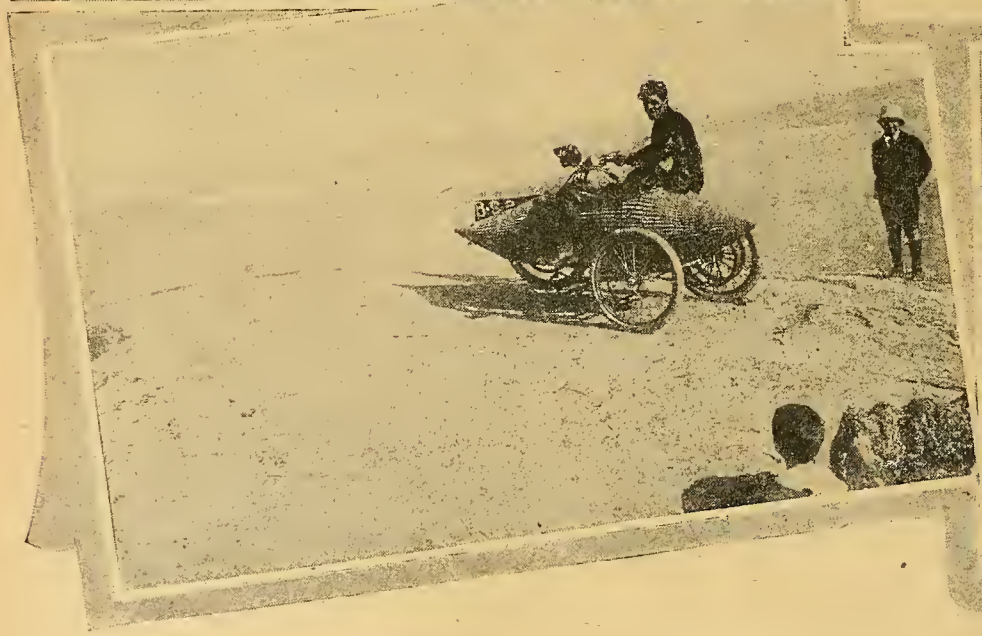
A motor cycle is a motor car within the meaning of the Act.

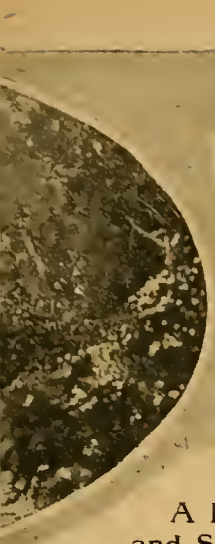


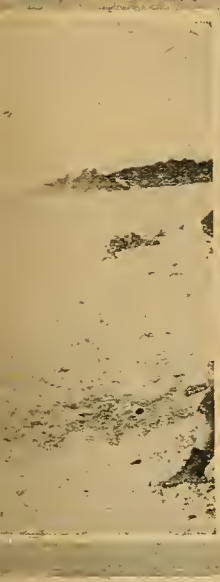
ASCENT OF MOUNT CLARENCE.

FIRED by the example of two drivers of a Overland car which had succeeded reaching the summit of Mt. Clarenc Western Australia, T. J. W. Evans le Perth on a 3½ h.p. B.S.A. with O. S. Burt in the sidecar at 6 a.m. on September 16th f Albany. The roads at first were very bad, a the riders were much troubled by "spoo drains and patches of loose gravel and san In spite of these difficulties they reach Kojonup about half an hour earlier than th expected. But owing to belt trouble, and t slow driving necessary when it became dar Albany was not reached till midnight.

On the following day a successful attempt w made to climb Mt. Clarence in the presence a large number of Albany residents, and t zigzag course recently traversed by the Ov land car was chosen. There was no road, a the riders had to pick their way as they b could over the boulders, sand, and round sha turns. (In some cases the bicycle and sidec







A B.S.A. and Sidecar climbs a Western Australian Mountain.

nd.) In spite of all diffi-
ı was climbed in thirty-five

next day in rest and pre-
ıd Burton left Albany at
ect of establishing a record
nd Perth. The Town Clerk
ekeeper, and many Albany
) see the start. The run to
ade in excellent time (ten
chedule). Then followed a
p, where refreshments were
engine replenished. After
was resumed with half an
r Williams the belt broke
and occasioned some delay.
t onwards the journey was
nd Perth was reached at
ey of 238 miles having thus
welve hours.
ormed excellently, and the
re no trouble whatever.

MANUFACTURING PERMITS EXTENDED.

New Machines for National Work Only. Agents in future to obtain Permits to supply New Motor Cycles.

IN one of our leading articles this week we review an important letter issued by the Ministry of Munitions (Department of the Director General of Mechanical Transport) concerning permits for the manufacture of new motor cycles and their distribution. Henceforward, agents will require to obtain permits to supply new machines. In our leader we commend the Director General of M.T. for his clear and concise statement, and as further proof of the fact that a business man has dealt with this subject we may cite the fact that a copy of the letter issued to manufacturers, together with a covering note acquainting us with the position, was sent to the Editor of *The Motor Cycle*.

The letter is given *in extenso* hereunder, since the new ruling affects the buying public to a considerable extent :

"Ministry of Munitions of War.

"Dear Sirs,—In regard to the Permit which has already been granted you to continue the manufacture and assembling of motor cycles, I am now directed to inform you that the whole question has been receiving the most careful consideration of the Ministry, and it is hoped that it may be found possible to place orders with you for work in connection with some Government Departments, though at the moment no such promise can be made definitely

"I am, therefore, to inform you that the Permit already granted you is hereby extended until such time as you receive such orders, when it is to be understood that you will immediately give up work under this Permit and concentrate your whole energies upon the Government order.

"Under this Permit it will be necessary for you to apply to this Department before effecting the sale of any motor cycles made by you, but in order that all firms may be placed upon the same basis, this condition will only apply to machines completed by you after February 24th. I may say that, in view of the great demand it would make upon the time of our inspectors, it is not proposed to take any steps to check the stock of cycles already made by you, and not, therefore, subject to the above condition, but it is to be left to your honour strictly to abide by the spirit of this letter, and to schedule all machines now complete and keep them separate from those completed after February 24th.

"I cannot, however, too strongly urge upon you the absolute necessity in the national interest of exercising the greatest possible care in the sale of all these machines, so that they may only be placed in the hands of those who must have them for work of real importance, such as doctors, farmers, etc. As a guide, may I say, for instance, that it is not always in the national interests that a motor cycle should be used to enable a man to get to and from his work; in some cases he could live nearer his work, while there are, of course, cases where the housing problem is so difficult that he could not be asked to do so.

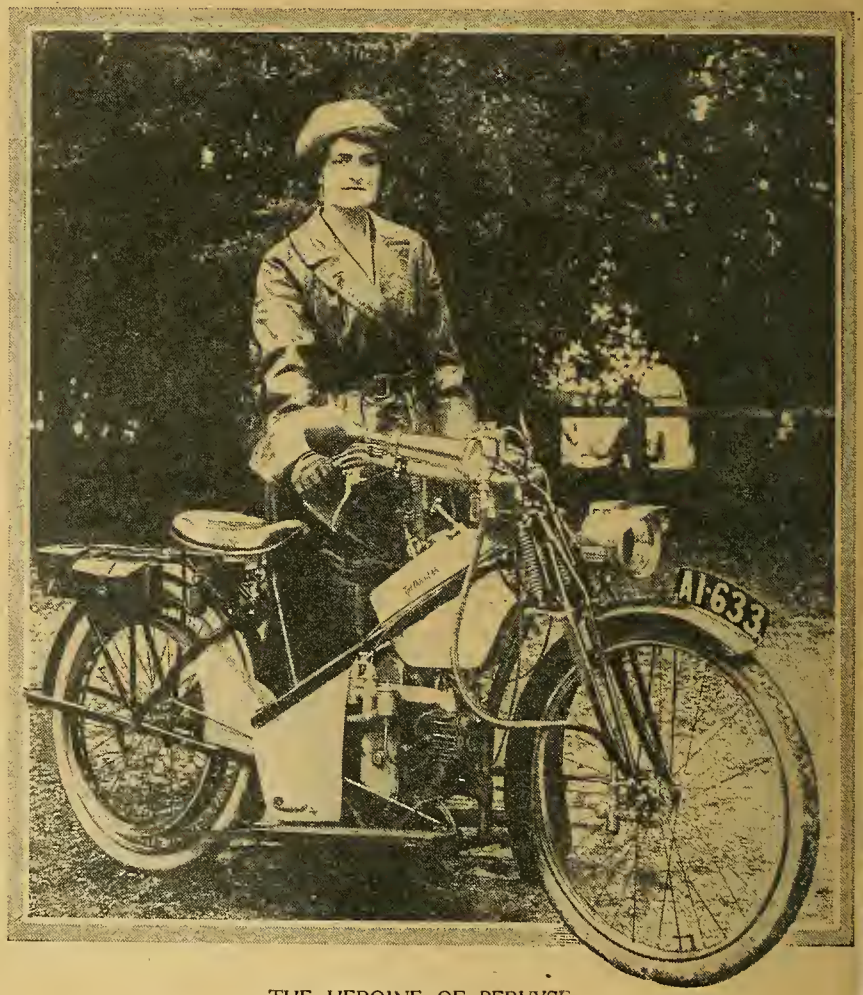
"The difficulty, however, could be overcome to a very large extent by your exercising your utmost endeavours to export the whole of the motor cycles manufactured by you; this would not only save a certain amount of petrol consumption in this country, but would also benefit the exchange.

"Under the terms of this letter there will be no objection to your selling a certain number of machines to your agents, provided that you are thoroughly satisfied as to their *bonâ-fides*, and that they will give you an undertaking that they will not dispose of the machines without a Permit from this Department. No machines should, however, be sold to agents in whom you have not complete confidence that they will loyally carry out the terms of this undertaking.

"I shall be glad to hear that you are prepared to accept the conditions imposed and implied in this letter, and to give you any further information that I can.

"I am, yours faithfully, BASIL H. JOY,

"For Director General Mechanical Transport."



THE HEROINE OF PERVYSE.

Baroness de Serclaes, the heroic Englishwoman who, with Miss Marie Chisholm, was decorated by King Albert for her bravery in the great retreat. These ladies are now Chevaliers, and entitled to military salute. For months they lived in a cellar at Pervyse, where they did marvellous first aid work in trenches. Baroness de Serclaes is a keen motor cyclist, her mount being a lady's model Douglas.

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address

MOTOR-ASSISTED BICYCLES.

Sir,—I see in your issue of March 1st that "Cyclist" expresses the hope that inventors will provide for the declining strength of veteran riders. I think I may lay claim to be a veteran at seventy-three years, and am well provided for with a 2½ h.p. four-stroke. I am 12½ stone, and yet it takes me up any ordinary hill. It has neither pedals nor speed gear, and has covered over 6,000 miles without any trouble whatever. If "Cyclist" knew the comfort and convenience of a machine of that sort, he would never think of pottering about with a motor-assisted bicycle nor blame the inventor for not providing one for him.

Insch. ONE OF THE BOYS.

YEAR OF ORIGIN.

Sir,—Two friends of mine in this district (Wallasey) and I each bought a second-hand 3½ h.p. Triumph. When comparing purchases we endeavoured to ascertain the year of origin of each machine, but were unable to do so definitely. I therefore wrote to the Triumph Co., Coventry, quoting the engine numbers, but the answer I got was "that it was not their custom to give any information regarding their machines, except to the original purchasers." Now that person (whoever he was) would not need to ask such a question, because he would know when he bought it, but if we should try to sell our machines, how can we give the date of origin when, as owners of machines, we are treated (as I consider) so unfairly? W. R. WEAVER.

PORT DESIGN IN TWO-STROKE ENGINES.

Sir,—I shall be pleased to have a friendly test with "Metro." However, why waste precious juice running out to Sunrising, when we have Weatheroak Hill so near home, which would be quite as good a test for both machines? I will let him know when I am fit; at present I am in the doctor's hands.

Our friend "Ixion" seems to doubt my statement *re* my Excelsior's hill-climbing. What about the following done on a Baby Levis? I climbed Fish Hill, Broadway, on this machine after twelve months' hard wear; also toured the Wye Valley, Hereford, Ross, Symonds Yat, Monmouth, and home *via* Gloucester and Evesham, climbing all hills with ease. I should like to hear other two-stroke riders' experiences as regards hill-climbing, etc., as according to "Ixion" and "Metro" my Villiers is no ordinary engine.

Birmingham. EXCELSIOR.

REAR SPRINGING OF MOTOR CYCLES.

Sir,—I read with interest an article on the double eccentric spring hub, and beg to offer a few comments. (1.) I agree that there is a question as to how much movement to give to the wheel, but I think 2in. total rise and fall would be sufficient to damp out only small vibrations, and anything in the way of a pot-hole or tram "stud" would be felt very badly, at least this is my personal experience. The ideal would be to have, say, 2in. movement against moderate resistance, after that rapidly increase the resistance up to, say, 3½in. This, I believe, has already been adopted by at least one designer with great success. (2.) With regard to the twisting action of most spring frames due to deletion of triangle A.D.B., this is a point which is not generally understood, and is most important. It has been overcome by joining the points at each side of E to the top of the carrier where the spring is fastened, as on the "A.B.C." But this puts great strain on the bearing E; in fact, all side strains. I do not quite see why the axle I is the keystone of the whole structure, but surely it is never missing? One hopes not when going downhill! (3.) I can understand how this ingenious hub works on the rear wheel, but fail to see why it should be adopted for the front. Where is the radius rod, and if there, why? C. W. PIDCOCK.

[The axle is always present but it does not always rigidly connect the ends of the stays.—ED.]

A STURDY MIDGET.

Sir,—I notice in "Ixion's" "Comments" in your last issue that a country agent has pointed out that the modern baby engine cannot approach the performance of the ten-year-old 2¾ h.p. single-cylinder o.h.v. J.A.P.

If the country agent mentioned will refer to the present British motor cycle class records he will see that the modern single-cylinder engine more than holds its own with the ten-year-old one.

I refer to the records in Class B (350 c.c., 2¾ h.p.) as under:

	Date.	Machine.	M.P.H.
Five miles ...	14/ 6/13	(one-cyl. Singer) ...	64.93
Ten miles ...	9/ 8/13	,, ,, ...	60.56
Fifty miles ...	16/ 6/13	,, ,, ...	63.88
One hour ...	19/10/13	,, ,, ...	62.68

All held by G. E. Stanley.

Then again, in the Miniature Class A (250 c.c. 1½ h.p.):

	Date.	Machine.	M.P.H.
Kilo	17/4/14	(one-cyl. Singer) ...	57.65
Mile	17/4/14	,, ,, ...	58.63
Five miles ...	25/7/14	,, ,, ...	52.29
Ten miles ...	25/7/14	,, ,, ...	51.28

All held by W. A. Jacobs.

I consider that the mile record, as above, is of particular interest, and, when peace comes, it will be interesting to see who is going to knock off the necessary 1⅘s. to bring this speed up to 60 m.p.h. G. J. McINTOSH.

THE FLAT TWIN AT THE BAR.

Sir,—We have read with the greatest interest the discussion which has been going on for some time between Mr. Bradshaw and Mr. O. de Lissa on the merits of the flat twin and V engines. No wonder that the discussion got sometimes rather hot considering the spirit of the fighters.

As manufacturers of the M.A.G. engines, we have naturally the highest interest in seeing these defended against any newcomer, but at the same time, we did not see our way to taking part ourselves in the discussion, as we never know what type of engine we may elect to build in the future. For the present, we are satisfied with the results we are obtaining with the V type, although we highly appreciate the performances of the small flat twin engines, of which, however, we have no personal experience. As to the powerful flat twin, we believe it will be better to keep the discussion open until actual results will have provided the necessary facts.

We would thank you for informing your readers that we are entirely unconnected with this controversy, and that principally and systematically we have always avoided and will always avoid all kinds of polemics, technical or personal.

If we venture at this issue to break our silence it is because we have seen with extreme regret that in *The Motor Cycle* of February 1st, "A.M.I.E.E." extends the discussion to a political one with a vicious hit against the Swiss industry in general.

We congratulate Mr. Little John and Mr. de Lissa on their replies to "A.M.I.E.E." in the following issues of February 8th and 15th, and beg to add that probably a much

larger portion of the Swiss industry would devote its entire energy to work for the Allied requirements if it could be supplied with the necessary materials. If up to the present the Swiss industry has been able to render services of the very highest importance to the Allied Armies, these efforts become more difficult every day, as material gets scarcer and harder to obtain.

As to the fairy-tale of the 300 submarine engines, this has been denied again and again, and we believe it superfluous to add a further denial to those already made with better authority than ours. THE MAG ENGINE CO.

Geneva.

CONCESSIONS TO SERVICE MEN.

Sir,—Your suggestion of concessions to Service men is one that deserves every support. Last year it cost me 25s. tax for less than 300 miles, and I was fortunate enough to have three or four seven-day passes. Part of the time was occupied in overhauling and cleaning up—one of the things for which you suggest an alternative. This year I have paid the £1 tax, and have petrol at home for a couple of hundred miles; but all our passes are stopped for the present, and I hardly seem likely to be able to use the machine until after the war.

I am pleased that *The Motor Cycle* fully maintains its old quality and quantity, and keeps up-to-date and interesting. I could not do without it.

With regard to the discussion as to who should hold driving licences, I have had to wear glasses since I was about fourteen, and have now been motoring for about five years, yet my licence is clean, though I seldom keep within the limit when out of town. It is proper driving that counts, not good ears and eyesight. (Rfn.) F. A. BUNN.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—It is a common trick for those who have not facts or figures on their side in an argument to try and be "funny" (?) I cannot congratulate your correspondent in his attempts in this direction in last week's issue of *The Motor Cycle*. His statement that I should fail to pass the test of "general intelligence" is, unfortunately, an infringement of a patent, as a previous correspondent made the same brilliant remark in your paper of February 15th!

With regard to his query about deaf riders riding in the middle of the road, my experience is that in the country lanes *all* riders take the middle of the road. This is, of course, quite safe so long as the rider has good sight and hearing; but, if not, there is good chance of an inquest. Endorsement of licences has nothing whatever to do with the question, except in the case of *town* riding. In the country there is seldom any policeman about to witness an accident, hence conflicting evidence and no endorsement of licence.

It is certainly rough on a disabled soldier if he is refused a licence, but what about the general public if he be granted one and through defective sight or hearing causes a smash up (as has often happened)?

The best vindication of the truth of my statements is to be found in the long list of motor accidents which occur every year. Motoring is really one of the safest of sports *if only* a little intelligence is used in driving. Most drivers, if they have travelled over a certain road two or three times without meeting anything, seem to think that there is no need to use their horns the fourth time, and trust to luck. In the winding lanes I meet such almost every time I am out, and if *I* did not use my horn there would be a daily smash up, as lanes are not wide enough for two to pass in many places. M. HITCHCOCK.

Sir,—In your issue of the 15th inst. appears a letter from a Mr. A. L. Gray, who, in advocating that persons unfortunately minus the sight of one eye should be debarred from holding driving licences, states that in the only collision in which he has been involved the "other party" was afflicted in this manner He further states that, owing to his disability, the "other party" was unable to judge the distance between his and Mr. Gray's motor.

He then applies this—his opinion—to all one-eyed motorists.

How are we to judge if Mr. Gray was in any degree culpable in this collision, and what evidence can he produce to show that such is not actually the case? It is not unreasonable to suppose that your correspondent may be a road hog of the worst type; on the other hand, he may not. The bad taste of his second sentence is a portent favouring the former supposition.

Mr. Gray's letter gives no clue as to whether or not he has had any military experience. My own extends over thirty months, and during this time I have learned to respect the distance judging abilities—in visual range taking practice and in the field—of those members of the Forces who in the execution of their duty have lost one eye.

It is men such as these that Mr. Gray would deprive of the pleasures of motoring on the King's highway, simply because he, being blessed with two eyes, "is able to see what they cannot." At least so he tells us. C.Q.M.S.

Blyth.

[Many other correspondents adopt this point of view.—Ed.]

Sir,—Your correspondent, Mr. M. Hitchcock, is evidently not a motor cyclist or he would not talk as he does. I submit that there is not any reason why partially deaf or deaf persons should be precluded from holding a licence if they—

(1.) Keep to the left.
(2.) Use their eyes.
(3.) Carry a reflector on their handle-bars.
(4.) Use care and observe the rules of the road when passing from main roads to byroads or *vice versa*.
(5.) Use a hooter whether they can hear it or not.

As to runaway horses, so few of these creatures are met nowadays that motor cyclists have little to fear from them.

I suppose in a fog a continuous sounding hooter is to be used. Imagine the result in a crowded, trafficky area. If £5 is to be levied every time the motor cyclist fails to use his hooter when he cannot see fifty yeards before him, a host of policemen will be required to watch all such places, or perhaps Mr. Hitchcock will suggest a scheme.

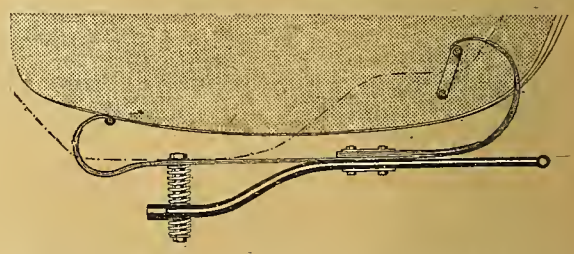
As to "general intelligence" test, what are standards of "general intelligence" required?

Also does he include in his bann those maimed partially, and to whom he would deny the pleasure of riding a motor cycle with specially arranged controls? L.H.T.

Ashby-de-la-Zouch.

FITTING A NEW SIDECAR BODY.

Sir,—Seeing one or two notes published recently of readers making improvements to their machines to bring them up-to-date, I send this as a good tip to make a 1913 Enfield look modern. You will know that the sidecar chassis has the



front dropped and the sidecar is of the chair pattern, which I got to dislike, as the sidecar is the first thing to make a combination look out-of-date. I did not fancy paying the price of a complete new one, so I bought a new body and fixed it in the following way: I made a pair of shackles 5½in. long for the existing back C springs, which I moved backwards as far as possible (2½in.) and fastened with bolts. I got from a local garage a pair of front C springs. These had been of the back and front all in one variety. The back being broken, I got them cheap. I then assembled the front spiral springs, which formed a spring platform for the flat springs. A bar under the front finishes the job, which looks well and rides well. BOB BRIERLEY.

FORCED INDUCTION FOR FLAT TWINS.

Sir,—As "C.L.V.C. 2872" in his letter in your issue of February 22nd has asked for a criticism, I, as a designer, would like to say a few words. I will answer his article, for the sake of space, in the order of his lettering. *(a.)* This would be even worse than employing long induction pipes, which, after all, can easily be lagged or bound with asbestos. *(b.)* Granted *(c.)* In the first place, he has not told us if the cycle of the pistons is in opposed direction. Secondly, how on earth does he get twice the c.c. of one cylinder compressed into the crank case, by what means, and also how does he get this volume forced

into one cylinder? Does "C.L.V.C. 2872" know that if the former principle were possible, the extremely high compression would be likely to cause pre-ignition? *(d.)* This is only complicating the mechanism. The employment of two valves for exhaust is common in the speed world.

To sum up, the use of automatic piston inlet valves should be avoided at all costs. They are horribly inefficient, likely to gum up, dangerous, difficult to get at, and impossible to fit in a motor of small c.c. In fact, no design has yet been made to make the piston valve a real success. I should be interested to know, therefore, why a motor of 2¾ h.p. on this principle should develop more power than the present 3½ h.p.

I shall be glad to answer any questions that "C.L.V.C. 2872" may put to me. W. F. MAITLAND EDWARDS.
B.E.F., France.

COMMENTS ON THE POST-WAR MATCHLESS.

Sir,—Everyone during the past few weeks has been gazing with interest at the new Matchless which is going to be placed on the market *après la guerre*. But there is one point in particular I should like to draw Messrs. Colliers' attention to. Their announcement in a recent issue drew attention to the detachable wheels with knockout axles. So far I do not complain; the wheel is quite easily detachable. But unless the mudguard is movable the wheel cannot be taken out without lifting the machine up, so that it needs two people to change a wheel. I should suggest that the present type of rear stand required redesigning, so that it would lift the machine considerably higher and give more clearance to get a wheel out. If the "stand" were made so that it "jacked" the whole back of the machine and sidecar up by means of a hinged affair on the back axle of the outfit between the two wheels, this would help considerably, and with such a heavy machine a stand such as the Pope machines were fitted with would be an improvement.

As to the abilities of the machine I await the peaceful days to see what it can do. I will admit being interested, even though it is a horizontal twin, and since it is made by Messrs. Colliers it should be good; and I have no doubt they will find their present machinery very useful in turning the engines out in large quantities. LITTLE JOHN.
S. Farnborough, Hants.

SINGLE V. TWIN-CYLINDER ENGINES.

Sir,—Concerning singles and the letter from "Progress," gear ratios are chosen apparently to make use of the high-power-at-low-revolutions characteristic. There is usually a big gap between the top and the middle gears. On a gradient just too steep for top there is great temptation to allow slow tugging, because the results of a change down to middle gear are: gear box noise, racing engine requiring continual attention from throttle, and a big drop of road speed, which makes it almost impossible to change up again without knocking until the road is level or nearly so, owing to the fact that the engine has become hotter with decreased wind on middle gear. This shows the need for a four-speed gear box, as a low emergency bottom gear must be retained, but if possible *the two higher gears should both be direct.*

The four-stroke single as a type requires a greater number of gear ratios than twins, four-cylinders, and two-strokes. It also requires greater flywheel effect, and this fact is seldom appreciated. A large diameter outside flywheel of heavy rim, combined with a kick starter of longer leverage, would make starting up independent of temperature and amount of oil in crank case. The latter could be of cast iron for cheapness, as its size would be small and ground clearance large. W. R. DEUCHAR.

Sir,—I was very interested indeed with "Ixion's" remarks about the 7-9 h.p. solo machine, being a rider of this particular type of machine for over two years.

He states he dislikes the weight of these machines, and I wonder if he has ever tried the Indian road racer, as this machine is no heavier than the majority of the latest singles, and the balance is perfect.

I consider, myself, this machine to be the finest solo motor cycle on the road, as it can be throttled down on a high gear, will tick over in free, and show remarkable acceleration, and is speedy enough to satisfy any speed merchant.

I have no intention of ever going back to a single, and shall stick to the 7-9 h.p. twin, unless the flat twins are proved to be better in every way.

The only drawback to the Indian road racer is that no kick starter is fitted, and one has to push to start.

Usual disclaimer, please. CUT ALONG.
Hampstead, N.W.

Sir,—I should be pleased if you could find space in your interesting paper, of which I have been a reader for just over seven years, for the following remarks.

I read in *The Motor Cycle* a few weeks ago some remarks by "Ixion" and "Road Rider" on the single and flat twin controversy. I must say that I agree with "Ixion" on the matter. I have had a little experience on singles, and some of the best makes—in fact, I own a single; but I fail to see where a 3½ h.p. single can be compared with a 3½ h.p. flat twin, especially if the flat twin has a spring frame. I live near a friend of mine who has in his garage two flat twins, both of different makes. Last week I had the pleasure of sampling one of these mounts for the first time. I must say that this was the most comfortable machine I have ever ridden. The springing was far superior to that of any single I have ridden yet, and the acceleration was more like that of a car.

"Road Rider" remarks that the single is far more accessible than the flat twin. But before the flat twin has been on the market as many years as the single it will be quite as accessible. GREENHORN.
Bodmin.

Sir,—Having had some years' experience with internal combustion engines of all types, and being an aero engine designer, I should like to express an opinion with regard to the matter. For the sake of space I will try to be brief.

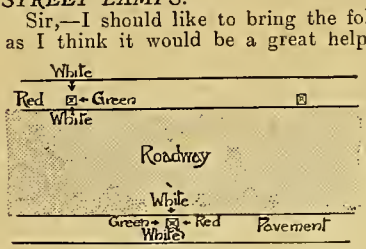
From an engineer's point of view there is no comparison between the two. I have nothing to say against the single, as it has been brought to a stage of almost perfection; but the multi-cylinder, if well designed, is much better, not only in theory, but in practice. A point in brief. In a single four-stoke all explosive energy is concentrated on one stroke; the other three movements are, necessarily, waste. There is enormous stress on that single movement, which in a twin is broken up into two, each cylinder receiving its share, therefore eliminating to a great extent the shock imposed for that power upon the moving parts and bearings. The twin again lends itself to more perfect balance than the single, and perfect balance is the keystone of engine design.

With the flat twin we have the nearest approach to the perfect motor cycle engine. The balance is perfect, the explosion stresses being opposed, as the two engines fire after each other, besides a hundred and one minor details of design. I am glad to see that Mr. Collier, who has done such a lot for the motor cycling world, has at last gone in for the flat twin.

To finish, a man with a fair knowledge of petrol motors need have no trouble with the modern twin. I am afraid most arguments to the contrary have been made or based upon machines of rather inferior design. The flat twin has only just lately been properly recognised, and I am certain that that type of machine will ultimately be adopted.
O. F. MAITLAND EDWARDS.

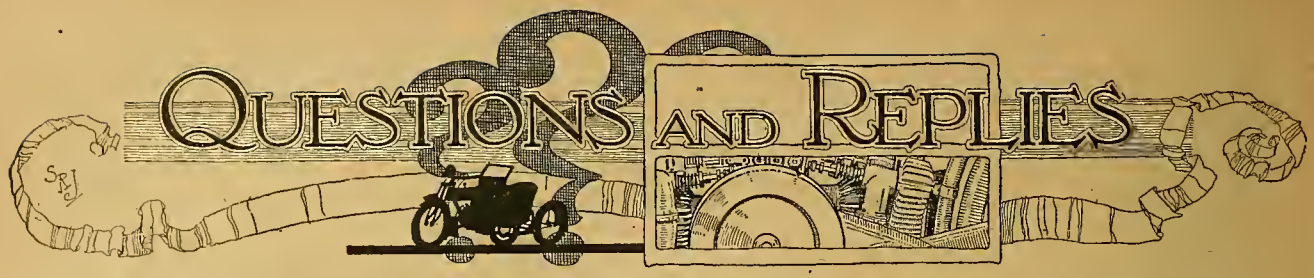
STREET LAMPS.

Sir,—I should like to bring the following idea before you, as I think it would be a great help to all motorists.



A suggested scheme of multi-coloured street lamps. The sketch illustrates our correspondent's ideas.

Very often when driving at night you notice a lamp-post come into view, and, owing to a bend in the road, it is impossible to tell which side of the road the lamp is on. Now if the lamps were painted in the following manner, I think it would save a lot of accidents and be a great benefit to all drivers, for it would only be necessary to keep a green light on the right and a red on the left. Of course, a central lamp at a corner would be green on all sides. CHARLES ROOTE.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C., and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

A Question of Altitude.

Which is the highest point above sea level in the county of Somerset?—F.E.R.

The highest point above sea level in Somerset is Dunkery Beacon, on Exmoor, West Somerset, the altitude being 1,707 feet.

Vibration.

(1.) I have a lightweight motor bicycle, out of which I cannot get more than 25 m.p.h., and at that speed the vibration is very excessive. (2.) After I have opened the throttle halfway, it makes no difference to the speed. The engine has been cleaned.—T.G.C.

(1.) The trouble is probably due to the engine being badly balanced, unless you mean road vibration which can be modified by fitting a more comfortable saddle. (2.) Possibly too large a jet has been fitted, and the engine chokes owing to too much petrol, or it may be that the area of the inlet pipe is equivalent only to half throttle.

Excessive Noise.

I bought a 1915 motor cycle new in October, 1916. This is the third mount I have had, and the noise it makes is awful. The machine in question is a 4¼ h.p. single, fitted with a Sturmey-Archer three-speed countershaft gear, and I always ride solo. The noise of the exhaust and tappets is simply deafening. Leading from the cylinder to the silencer is a pipe 1½in. outside diameter, and the outlet pipe from the silencer is 2ft. 4in. long × 1⅞in. ontside diameter; the silencer itself measures 2¾in. diameter × 7½in. (1.) How can I improve the silencer? (2.) Is there any means of getting the tappets to work more quietly? (3.) By fitting Druid spring forks instead of present standard forks, could I get less vibration on handle-bars?—R.H.McL.

(1.) What you want is a very much larger expansion chamber, and you might also try flattening the end of the final exit pipe through which the exhaust gases enter into the open air. (2.) We do not think you can do anything to the tappets beyond adjusting them carefully. (3.) It depends upon the cause of the vibration. If this is due to the road the fitting of different forks might make a difference, but if it is due to the engine then the new forks will convey the vibration to your hands in just the same manner.

The Use of Petrol Substitutes.

(1.) Will the use of petrol substitutes be allowed after March this year, if one's petrol licence has expired, or will motor cycling, except on national work, be prohibited? (2.) Would it be safe to use a vaporiser with petrol substitute mixture?—L.C.S.

(1.) There is no reason to suppose that there will be any ban at the present time on petrol substitutes. (2.) You should certainly use a vaporiser with a petrol substitute, or fit a warming device, which could be employed with petrol or any fuel, as it is always beneficial.

Remagnetising.

Would you kindly tell me the way to magnetise my magneto from a dynamo? The magneto has become weak. I cannot send it away, as I have to use the cycle practically every day. The magneto is of the Bosch type fitted to a Douglas engine?—H.B.

It is practically impossible for an amateur to remagnetise magnets satisfactorily; it is a task for an expert. To make a satisfactory job of remagnetising the magnets have first to be treated by a heat process to remove all magnetism. They are then rehardened and magnetised by placing them in contact with the poles of an electro magnet. The current is switched on and off several times for the necessary period to effect the remagnetisation. Are you sure the trouble with your magneto is weak magnets and not faulty contacts somewhere, owing to dirt or oil? When the magneto is detached from the engine the armature should jump round with a perceptible snap as it is turned over the maximum point. If it does so, and a reasonable amount of resistance is felt when turning the armature, it is evident the fault is not due to weak magnets. You should then go over all other points carefully, see that the high-tension carbon brushes are in good order and quite clean and free from oil, attend also to the contact breaker, see that the points are clean and not pitted and are breaking equally for both cylinders; the gap should be .4 mm., and make sure the rocker arm is absolutely free in its bearing. If the magneto has not been overhauled for some time it would be as well to remove the armature and see that the whole machine is quite clean inside; sometimes dust or foreign matter bridging the gap between the armature and the fields will have much the same effect as weak magnets. The magnets becoming demagnetised is a very rare occurrence indeed. Directly the armature is removed from the magnets place a piece of iron, such as a large spanner, between the magnet fields to act as a keeper. This is very important, especially if the armature is removed for any length of time.

DELAYS IN POSTAL DELIVERIES.

In view of depleted staffs, the curtailment of railway services, and the consequent delay in delivery of mails, readers will greatly assist by forwarding communications (including advertisements) as much as possible in advance of the dates of the issues for which they are intended.

Inlet Valve Lift.

(1.) What is the correct opening for an automatic inlet valve on a 3½ h.p. engine? (2.) Which would have the greater braking effect going down a hill at 15 m.p.h., lifting the exhaust valve or closing the throttle?—E.W.

(1.) About $\frac{3}{32}$nds of an inch. (2.) Lifting the exhaust. Of course, closing the throttle merely creates a vacuum in the engine, and there is no retarding effect, and the compression when the throttle is open acts merely as a cushion.

Failure to Start.

I have a 1911 2¾ h.p. twin, just overhauled, including the magneto, and it seems to be in good order, but I cannot get it to start. If I run with it for some time, it will fire six or seven times and then stop, and it only fires in one cylinder. It is getting plenty of petrol; when I open the throttle pure petrol runs out of the exhaust pipe. I have checked the timing, and found it all correct. I have also tried different makes of plugs, but found no difference, and when I put the plugs on top of the cylinders they seem to spark all right. I have also tried the throttle and air in all positions, but with no effect, and have packed all air leaks.—NOVICE.

Evidently the magneto is in good order. The difficulty in starting may be due to your having obtained some bad petrol (of which there is plenty about at the present time), or to the automatic inlet valves sticking. We should advise you to take these out and examine them carefully, see that both valves have about the same lift, and that the springs are reasonably strong, also that the valves are working freely.

Noisy Timing Wheels.

I have had the engine of my 3½ h.p. motor cycle down completely, and since refitting it gives forth a weird noise like the humming of a turbine or dynamo. This can be heard when turning by hand; it is very pronounced when slowing down after running on the stand. I have not run on the road since. When refitting, everything went quite freely into place, and no force was used. The flywheels were not dismantled. The crank case is well charged with oil. I certainly do not want the bother of taking it down again if you could suggest what is wrong, and assure me that it is unimportant. The engine seems quite as free as usual, and has a lively, healthy bark. The engine is a 1914 one, and has never had anything wrong with it.—F.M.T.

The noise may be due to want of oil in the timing gear case, or to the wheels being too closely in mesh for some reason or other. Without actually seeing the engine and hearing the noise it is a little hard to give a definite opinion.

Timing a Four-cylinder.

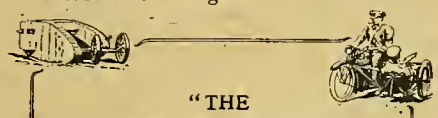
(1.) Would you please tell me the best way to time my four-cylinder F.N. motor cycle as regards the firing and exhaust valves? The engine is the old type, and fitted with a B. and B. single jet carburetter. I have had the magneto remagnetised and the engine overhauled, but it will only go for three minutes and then stop; it seems only to be firing in two cylinders. (2.) Would the carburation have anything to do with the engine stopping?—G.R.R.

(1.) The exhaust valves should be timed as follow: Set the exhaust valve to close just after the completion of the exhaust stroke. It will then commence to open when the piston is about one-seventh of the length of the stroke from the bottom of the firing stroke. The ignition should be timed as follows: Turn the crankshaft until the piston of the *back* cylinder is five to six millimetres from the top of the compression stroke. Unless the slide holding on the crankshaft has been altered, the carbon brush will point to the position of the bottom right-hand terminal of the distributer, assuming the latter is in position. Now grasp the contact breaker of the magneto, and turn it until maximum resistance is felt, and slide the magneto gear wheel into engagement with the corresponding wheel on the crankshaft of the engine. Having bolted up the magneto and fitted on the distributer, verify the timing. The points of the contact breaker should commence to separate when the back cylinder piston is in the aforementioned position. The wiring of the distributer in relation to the respective cylinders is: Bottom right wire to back cylinder; top right wire to third cylinder from back; bottom left wire to second cylinder from back; top left wire to front cylinder. The lengths of the wires will of themselves show to which cylinders they go. (2.) The carburetter may quite well be at fault. If there is a serious air leak at the induction pipe unions or at the carburetter union itself, and you had to inject petrol to start, the engine might run on the injection for a few seconds and then stop, as there would not be sufficient suction on the jet. The adjustment of the carburetter has a great deal to do with the starting of an engine. To start easily you should give a small quantity of rather strong mixture.

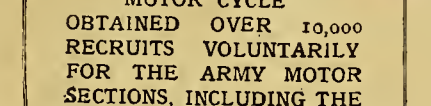
No Wonder!

I have a 1915 American magneto which I intended fitting to my machine, and when I had fixed it to the platform and turned the wheel there was a current through the machine with a fat spark at the plug. I then disconnected it from the machine and put it and the plug on wood. I then turned the wheel and found a poor spark at the plug. Could you tell me where I should be likely to find the leak?—E.H.

We do not think you will be likely to find a leak anywhere, as from your letter there does not appear to be any fault in the machine. It is rather curious that you get a spark at all if you lay the plug on wood, as wood is practically an insulator, or, at any rate, a very bad conductor of electricity, and it is through the wood that the return current had to pass to the base of the magneto.



"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.



Difficult Starting.

As I have just purchased a twin Moto-Rêve which is giving me considerable trouble, I should be very grateful if you would assist me. The machine is fitted with a B. and B. carburetter, and I get the following results from it when machine is on the stand: Unable to start engine when cold unless I warm carburetter and pedal hard. When engine is warm I can start by a push down on pedal and get fierce acceleration, but cannot throttle down below a road speed of twelve miles per hour without engine stopping. Wet petrol is blown from carburetter when engine runs fast on stand. On the road I am unable to start engine either by running or pedalling, although, as I say, one push will start engine if put on stand. Through reading your paper I have made sure of the following before writing you. That the exhaust valve closes at top dead centre. That it opens before the completion of the working stroke. That the platinum points break six millimetres before the end of the compression stroke. That when tested with oil no leaks show round the induction pipe, inlet, or exhaust valves. That there is a spark at each plug. That there is good compression in both cylinders. That variation in valve and ignition timing and alteration in size of carburetter jet does not improve the running. I am in doubt about the inlet valves (automatic). How can I tell if the springs are too strong or too weak? and how much opening should be allowed the valves?—C.W.S.

It is a little difficult to account for the trouble which you are experiencing, unless it is the bad petrol which one gets nowadays. The fact that wet petrol is blown from the carburetter seems to indicate that the inlet valve springs are too weak. We note that you have checked over the timing of the valves and ignition. Of course, the whole trouble may be due to the automatic inlet valves, which are sticking and sluggish when the engine is cold, and they also prevent slow running. You must have a mechanical valve to get slow running unless you so set the automatic valve that the springs are too weak for fast running. Automatic valves should open on a pressure of about five ounces being applied to the stem. This will give you an idea of the strength of spring required. The valves should open about $\frac{3}{32}$in.

READER'S REPLY.

Uneven Firing.

As a rider of an Enfield two-stroke, I should suggest that "W.P.S.," on page 199, March 1st, try a Sphinx B41 plug. I have found that this plug gives the best running for my two-stroke.—G. R. RISSEN.

RECOMMENDED ROUTES.

WOLVERHAMPTON TO MERTHYR TYDVIL.—R.E.J.

Wolverhampton, Kidderminster, Bewdley, Tenbury, Leominster, Willersey, Three Cock Junction, Brecon, Merthyr Tydvil.

LIVERPOOL TO ASPATRIA (CUMBERLAND).—H.T.

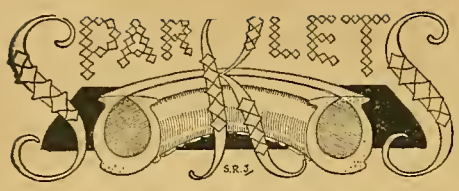
Liverpool, Ormskirk, Preston, Lancaster, Carnforth, Kendal, Windermere, Ambleside, Grasmere, Thirlmere, Keswick, Bothel, Aspatria.

NEWCASTLE-ON-TYNE TO OCKLEY (SURREY).—W.L.

Newcastle, Durham, Darlington, Northallerton, Boroughbridge, Wetherby, Ferrybridge, Doncaster, Retford, Newark, Grantham, Stamford, Stilton, Eaton Socon, Biggleswade, Hitchin, St. Albans, Elstree, Harrow, Sudbury, Hanwell, Brentford, Richmond, Kingston, Leatherhead, Dorking, Ockley. Approximately 365 miles.

GOSPORT TO MALTON, VIA SLOUGH.—C.E.H.V.

Gosport, Fareham, Wickham, Corhampton, Hedge Corner, Chawton, Alton. Farnham, Farnborough, Bagshot, Ascot, Eton, Slough, Denham, Rickmansworth, Watford, St. Albans, Hatfield, Welwyn, Stevenage, Baldock, Biggleswade, Eaton Socon, Alconbury Hill, Norman Cross, Wansford, Stamford, Grantham, Newark, Tuxford, Retford, Bawtry, Doncaster, Ferrybridge, Brotherton, Sherburn, Tadcaster, York, New Malton.



The Zephyr Motor Unit.

We are informed that the actual weight of the Zephyr motor unit, referred to in our issue of February 22nd, is 30 lb., and when the outfit is manufactured the weight will be reduced to 28 lb. by the employment of lighter metals.

Government Test of the Phillips Magneto.

Messrs. Phillips Magnetos, Ltd., Birchett Road, Aldershot, whose magneto we described in *The Motor Cycle* of November 2nd, 1916, inform us that this instrument was recently tested by a Government Department, which has notified the company that the magneto proved to be satisfactory in every way.

Petrol Substitutes.

We are informed that Messrs. A. W. Gamage, Ltd., Holborn, London, E.C., now keep a stock of petrol substitute in two-gallon tins. Delivery is uncertain owing to railway and transport difficulties, but motor cyclists can always get supplies by calling at Messrs. Gamage's Holborn depot.

Up to the present these substitutes do not come under the Petrol Committee's control.

The firm stocks two kinds of substitute — one closely allied to paraffin and the other similar to benzole.

Economy of the 3 h.p. Enfield.

The excellent consumption figures of the 3 h.p. Enfield have frequently been referred to in our pages. For instance, "Auriga" covered 520 miles (including the crossing of Dartmoor, which neccssitated much low gear work) on four gallons. Another member of our staff rode to Bristol and back (200 miles) on two gallons over winter roads. We now hear that 236 miles have been ridden over New Zealand roads on just under two gallons by Mr. W. G. Stenhouse, who says that the 3 h.p. Enfield is an ideal solo machine for use in the Colonies, where a machine has to stand up to some very rough and muddy roads.

Review.

"Electricity and the Motor Car" (second edition, revised). F. H. Hutton. Iliffe and Sons, Ltd., 20, Tudor Street, London, E.C. 2s. 6d. This useful publication has recently been revised and improved. While it appeals more especially to the owners of motor cars, the book is likely to be of great value to anyone using a motor vehicle of any type propelled by an internal combustion engine, as it deals with the electrical side in a most efficient and thorough manner. It is fairly safe to assume that most motor cyclists are potential motor car owners, and it cannot be otherwise than beneficial for a motor cyclist to read such an interesting subject as electricity as applied to motor cars. Not only is the subject dealt with from the lighting and starting point of view, but the question of ignition is also treated in a very efficient manner.

Petrol Pills.

The makers of the preparation known as Glitter Glass, which is used on screens when driving in the rain, now market petrol pills. These are simply dissolved in the spirit, and are recommended by the Atkinson Manufacturing Co., Ltd., Guildhall Street, Preston, as a means by which to eke out the petrol supplies.

Record Hub Gear Repairs.

The County Cycle and Engineering Co., 64, Staines Road, Hounslow, inform us of a record repair to a hub gear which they carried out recently. The gear was brought into their premises at 9.30, completely dismantled, all parts were shown to the customer, and those requiring replacing were pointed out. At ten o'clock, half an hour later, the wheel was delivered, and the customer found that the gear was in perfect condition. The company send us a letter from the customer confirming the facts we have just recorded.

Catalogues Received.

We are in receipt of a catalogue from Messrs. Cravens' Patent, Ltd., 97, Corporation Street, Manchester. In it we notice a selection of luncheon baskets, of a type highly suitable for drivers of sidecar combinations.

We have received a booklet describing the new Model H Matchless, that attractive 1917 model flat twin, details of which were given in *The Motor Cycle* of 16th November, 1916. The reading matter is, of course, intensely interesting, and the illustrations first-class.

"Case-hardening," a booklet referring to the D.B.S. carburiser, manufactured by Messrs. David Brown and Sons (Huddersfield), Ltd., Park Works, Lockwood, Huddersfield. Messrs. David Brown and Sons are closely connected with the manufacture of parts for all types of motor vehicles, and in the manufacture of these case-hardening is, of course, one of the most essential points requiring attention.

"Motor Cycles and How to Manage Them."

Recognised everywhere as the standard handbook on the motor cycle, its care and management. Every motor cyclist, whether beginner or experienced rider, will find the book extremely useful.

Price 1/6 net. By post, 1/10.

"Hints and Tips for Motor Cyclists."

This book gives hundreds of useful "wrinkles" and items of information concerning the running, management, and repair of motor cycles, and contains what may be termed the cream of up-to-date motor cycling knowledge. Altogether nearly 1,000 hints and tips are given.

Price 1/- net. By post, 1/2.

"Tracing Troubles."

Motor Cycle Faults, Their Identification and Their Remedies Fully Explained.

The object of this book is to enable motor cyclists not only quickly to trace the cause of any fault in the machine, but to remedy the trouble in the shortest possible time. The system is applicable to all makes of machines, both four-stroke and two-stroke.

Price 1/- net. By post, 1/2.

Obtainable through leading booksellers, or direct from the publishing offices of "The Motor Cycle," 20, Tudor Street, London, E.C., England.

A Good Substitute.

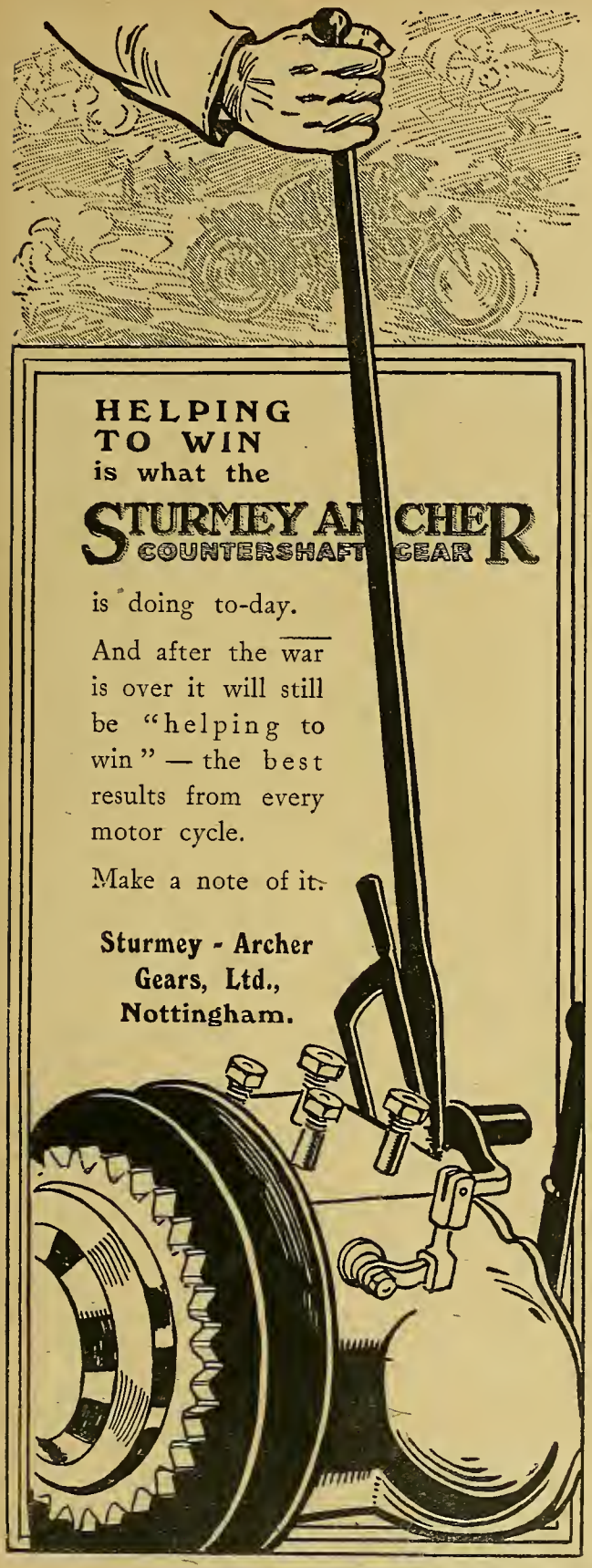
During the petrol shortage in the summer time, our attention was called to Petrolior, made by Messrs. Archibald Vickers, Ltd., 28, King Street, Covent Garden, London, W.C. Two members of our staff used this fuel with excellent results, one in a Matchless-M.A.G. engine and the other in a 4 h.p. Douglas. In neither case was any additional device employed, both carburetters being fitted with a warm air intake, but the Petrolior gave excellent results, only demanding that the spark lever should be judiciously adjusted from time to time when any sign of knocking occurred.

Petrolior is a hydro-carbon distillate containing neither paraffin nor petrol, of water-white appearance, and giving off a faint petrol-like odour. The flash point is 76-80°, and the specific gravity between .771 and .779. When evaporated there is practically no residue, the amount being less than .005.

AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*. Difficulty in obtaining a sufficient number of one model often arises, owing to the fact that many advertisers omit some of the essential details, while others include fitments not supplied with the standard machine.

Make.	Year.	H.P.	Average. for last week.	Latest weekly average obtainable.
A.B.C.	1914	3½ T.T. 3-sp. s-car.	—	£70
A.J.S.	1915	6 combination ..	—	£85
„	1916	4 combination ..	£90	—
Ariel	1916	5 3-sp. sidecar ..	—	£76
„	1914	3½ 3-sp. Armstro'g	£36	—
Auto-wheel	1914	B.S.A.	£8	—
Bat	1914	4-5 2-speed	£39	—
Bradbury	1914	6 combination ..	£48	—
„	1914	4 combination ..	£34	—
Brough	1916	3½ 2-speed	—	£66
„	1915	4 2-speed	£49	—
B.S.A.	1916	Model K	£55	—
„	1915	4½ combination ..	£58	—
Calthorpe	1915	2½ 2-speed	£27	—
„	1914	4 sidecar	—	£34
Chater Lea	1914	4 combination ..	£55	—
Clyno	1915	2¾ 2-stroke, 2-sp..	£18	—
„	1914	6 3-sp. sidecar ..	—	£65
Douglas	1916	2¾ 3-speed	—	£55
„	1915	2¾ W.O.	£44	—
„	1914	2¾ 2-sp. clutch ..	£40	—
Enfield	1916	6 com'cial comb.	£90	—
„	1916	3 2-speed	£45	—
„	1915	3 2-speed	£40	—
Excelsior	1916	2¼	£24	—
H.-Davidson	1916	7-9 combination	£80	—
„	1915	7-9 combination..	—	—
Henderson	1915	combination	£85	£60
Humber	1914	3½ 3-speed	£35	—
Indian	1916	5-6 3-speed	£50	—
„	1915	7-9 T.T.	£48	—
James	1915	4½ 3-sp. comb.	£58	—
Levis	1916	2½ 2-speed	—	£34
„	1915	2½ Popular	£22	—
Matchless	1915	7 combination ..	£72	—
New Hudson	1915	3½ 3-sp. comb.	£40	—
„	1914	2¼ 2-stroke	£22	—
P. & M.	1914	sidecar	—	£57
Precision	1915	4½ 3-speed	£30	—
Premier	1914	3½ 2-speed sidecar	£45	—
Quadrant	1914	4½ 3-speed	£28	—
Radco	1915	2¼	£16	—
Rover	1916	3½ 3-speed	£79	—
Royal Ruby	1914	3½ 2-speed twin ..	£35	—
Rudge	1916	5-6 Multi comb.	£51	—
„	1916	3½ 3-speed	£55	—
„	1915	5-6 combination .	£40	—
Scott	1916	3¾ combination ..	—	£68
„	1915	combination	£42	—
Sunbeam	1916	8 combination ..	—	£100
„	1916	3½ combination ..	£90	—
„	1915	3½ combination ..	£80	—
Triumph	1916	4 countershaft ..	£63	—
„	1915	3½ 3-speed	—	£55
Zenith	1916	4-5 twin	£50	—
„	1916	8 Gradua	£52	—



HELPING TO WIN
is what the

STURMEY ARCHER
COUNTERSHAFT GEAR

is doing to-day.

And after the war is over it will still be "helping to win" — the best results from every motor cycle.

Make a note of it.

Sturmey - Archer Gears, Ltd., Nottingham.

I SUBMIT there

is a solid reason why you should adopt a

BINKS CARBURETTER, viz.:
YOU CUT YOUR FUEL BILL IN TWO

if you adopt my system and use my fuel. You can, of course, use petrol or benzol without alteration.

Price of Carburetter complete—

49/-

plus 10% extra war cost.

Fit any Machine.

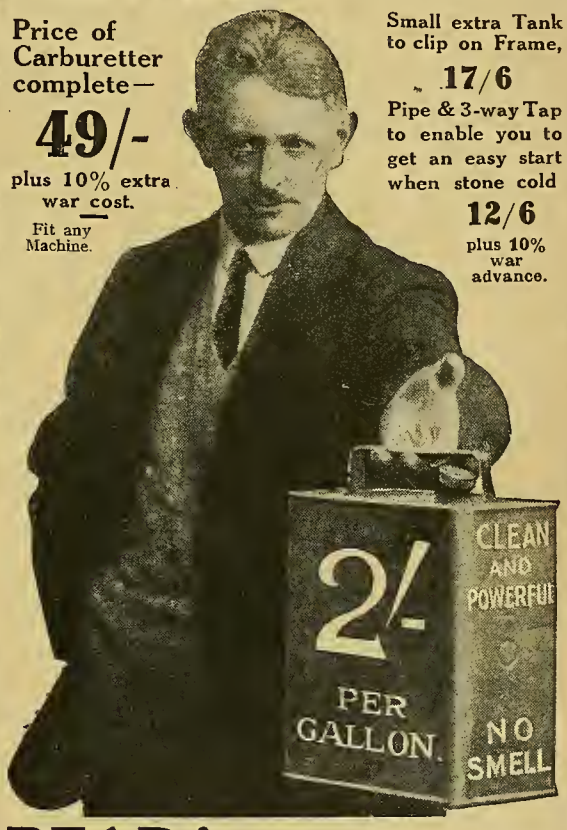
Small extra Tank to clip on Frame,

17/6

Pipe & 3-way Tap to enable you to get an easy start when stone cold

12/6

plus 10% war advance.



READ!

MY 3-PHASE JET DAMPING CARBURETTERS

have such perfect vaporising properties that they enable you to use fuel at **2/-** per gallon in 42-gallon casks, which you are allowed to keep on your premises. Casks **12/6** extra, returnable at **10/-** each, less ½d. per gallon rebate to users of the "Binks" Carburetters purchased within the last two years. Your engine will tick over dead slow, and pull dead slow in traffic, yet give the full power. It is almost impossible to tell you are not running on petrol at **3/-** a gallon. It cannot damage your engine or soot it up, and makes Motor Cycling possible in these times.

I give you my personal assurance of the truth of what is stated above. Please send at once for full particulars of the carburetter, and also for my Treatise on Carburation, and terms of One Month's Approval Trial.

Owners in London invited to apply to Messrs. Oylers, Ltd., of 35, New Cavendish Street, who have facilities for supplying and fitting these carburetters.

C. BINKS, Ltd., Eccles.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., & Co. and crossed

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed, "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged, when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

ABINGDON, 3½h.p., 1914, Grade Multi pulley; £25. —18, Beechwood Av., Thornton Heath. [X7411

ABINGDON King Dick, 3½h.p., N.S.U., F.E., Phœnix sidecar; £35; trial.—R., 304, Hanworth Rd., Hounslow. [9161

ABINGDON King Dick, 5-6h.p. twin, 2-speed countershaft, chain-cum-belt, just been overhauled; must sell; £30.—27, Woodbridge Rd., Moseley, Birmingham. [X7503

1915 3½h.p. Abingdon, King Dick, Phillipson, speedometer, lamps, horn, etc., very little used, as new; £33.—Apply, Saturday, Sunday, 2, London Lane, Bromley, Kent. [9281

A.J.S.

A.J.S., 2¾h.p., 2 speeds, chain driven, hand clutch, kick starter, semi-T.T. bars; £30.—Labram, 338, High Rd., Chiswick. [9279

A.J.S., 6h.p., 1915, best A.J.S. sidecar, speeds, hood, wind screen, really good; £84; extended payments arranged.—Service Co., 292, High Holborn, London. [X7426

1916 4½h.p. A.J.S. Combination, fitted with detachable wheels, Lucas horn, Lucas head and tail lamps and generator, Stewart speedometer, Lucas sidecar lamp and generator, spare wheel attached to sidecar, large kit of tools, tyres in good condition, perfect throughout; what offers?—F. E. Wootten, 55, High St., Oxford. [9274

NEW MODELS FROM STOCK.

ALLON, 2-stroke, 2-speed	42 gns.
B.S.A., 4½ h.p., 3-speed, chain drive	£66 0
B.S.A., 4½ h.p., 3-speed, model K	£64 0
CALTHORPE, 2-stroke, 2-speed	33 gns.
CALTHORPE-J.A.P., 2¾ h.p., 2-speed	38 gns.
ENFIELD, 2-stroke, 2-speed	42 gns.
ENFIELD, 3 h.p., twin, 2-speed	55 gns.
ENFIELD, 6 h.p., Combination	90 gns.
ENFIELD, 6 h.p., Combination, with Lucas dynamo lighting set	105 gns.
JAMES, 2-stroke, 2-speed	£42 0
JAMES, 3½ h.p., twin, 3-speed	£69 0
JAMES, 4½ h.p., Combination	£86 0
LEVIS Popular, 2½ h.p., 2-stroke	£32 0
NEW IMPERIAL, 2½ h.p., 2-speed	39 gns.
NEW IMPERIAL, 2½ h.p., 2-sp., clutch and kick-starter	46 gns.
ZENITH-GRADUA, 3½ h.p., twin	£62 0

EXCHANGES.

We specialise in exchange transactions, and will allow full value for your old Motor Cycle or Light Car in Part Payment for any new one.

SECOND-HANDS.

The following is a selection from our large stock of machines of all types:

ROYAL ENFIELD, 1916, 6 h.p. Combination, 3 Lucas lamp sets, Cowey speedometer, mechanical horn	£78 0
CLYNO, 1914, 6 h.p. Combination, Lucas electric lighting set, speedometer	£65 0
JAMES, 1915, 2½ h.p., 2-stroke, 2-speed, Lucas lamp set, rear lamp and horn	£32 0
ALLON, 1915, 2¾ h.p., 2-stroke, 2-speed	£32 0
MATCHLESS, 1913, 8 h.p., 2-speed, clutch, & kick-starter, all accessories and Gloria spring wheel Sidecar	£45 0
ZENITH, 1913, 3½ h.p., Gradua gear	£30 0
CALTHORPE, 1915, 2½ h.p., 2-stroke, 2-speed, headlight, rear lamp, horn	£27 0
DOUGLAS 1915 2¾ h.p. War Office model	£46 0
TRIUMPH, 1914, 4 h.p., 3-speed	£40 0
JAMES, 1916, 2½ h.p., 2-stroke, 2-speed, lamps, and horn	£36 0
ROYAL ENFIELD, 1914, 3 h.p., twin, 2-speed	£32 0
DOUGLAS, 1910, 2¾ h.p., lamps and horn	£15 0
CALTHORPE-J.A.P., 1915, 2¾ h.p., 2-sp., lamps and horn	£30 0
NEW IMPERIAL-J.A.P., 2½ h.p., T.T. model, 2-speed, Cowey speedometer	£35 0
ALLON, 1916, 2¾ h.p., 2-stroke, 2-speed, Lucas lamps, and horn	£38 0
ALLON, 1915, 2¾ h.p., 2-stroke	£25 0
CALTHORPE-J.A.P., 1915, 2¾ h.p., 2-sp.	£27 0
TRIUMPH, 1912, 3½ h.p., Bowden countershaft 2-sp. gear, clutch, and kick starter	£28 0
MATCHLESS, 1915, 7 h.p., Combination, M.A.G. engine, 3-speed and clutch, Lucas lamp and horn, speedometer and watch	£73 0
RUDGE, 1913, 3½ h.p., 2-sp., lamps, horn, mirror, Phoenix coachbuilt Sidecar	£34 0

Deferred Payments accepted for either New or Second-hand Goods.

EASTERN GARAGE CO.,

Official Repairers to R.A.C., A.C.U., A.A. & M.U.,

418, Romford Rd., Forest Gate, E.

'Phone: 490 East Ham. 'Grams: "Egaraco, London."

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [X7098

LATE 1914 6h.p. 3-speed A.J.S., and sidecar, almost new condition; £56.—Daisy Bank, Matlock. [X7471

Alldays.

1917 Allon, 2-speed, in stock.—Pickering, Mardol, Shrewsbury. [X6779

ALLONS, 1917 models, earliest delivery.—W. P. Edwards, Taunton. [X7079

1915 Allon, 2¾h.p., 2-speed, E.I.C., Senspray; 25 gns.—Railway Garage, Staines. [9308

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

ALLONS.—1917 2-speed models for immediate deliveries; £44/2.—Jones, Garage, Broadway, Muswell Hill. [9312

ALLDAYS Allon, new 1917 model, 2¾h.p., 2-stroke, 2-speed, with chain case; £44/17.—Carmarthen Automobile and Posting Co., Nott Sq. [X7513

ALLON.—All 1917 models in stock, 36-45 gns.; exchanges and deferred payments arranged.—Maudes', 100 and 136 Gt. Portland St., London, W. Tel.: 552 Mayfair. [7387

ALLDAYS Matchless, 1915 (late), 2¾h.p., lamps, toolbags, horn, generator, done 600 miles, as new; 17 gns., bargain.—Smith, Charlton Villa, Staines Rd., Bedfont, Middlesex. [9071

Antoine.

3½h.p. Antoine, m.o.v., h.b.c. carburetter, exhaust heated, new accumulator and back tyre, excellent running order; £10.—43, North St., Dudley. [9075

Ariel.

ARIEL, 3½h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [9211

RIDER TROWARD'S, 78, High St., Hampstead.—Ariel, 1913, variable gear, overhauled; 18 gns. [8997

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

ARIEL, 5-6h.p. 1914 Combination, speedometer, lamp, cover, carrier; £55.—Meaden, Hanover Place, Brighton. [X7436

ARIEL, latest model, 3½h.p., 3-speed countershaft, hand and foot operated clutch, fully equipped, not run 100 miles, unscratched; £38.—98, Willes Rd., Leamington Spa. [X7455

ARIEL, the reliable motor cycle, 3½h.p. single, and 5-6h.p. twin models; delivery from stock.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0889

ARIELS.—1917 5-6h.p. combinations and 3½h.p. combinations for immediate deliveries; cash, deferred, or exchanges with up-to-date machines, Douglas preferred.—Jones, Garage, Broadway, Muswell Hill. [9311

Arno.

REAL Bargain.—All red Arno motor cycle, 3½h.p., 3 speeds, 2 coachbuilt sidecars, 3 P.H. lamps, spare belt, £2 worth of engine spares, spare tyre and tube, tools, etc., Binks carburetter; trial allowed; reason of selling, owner buying car; £40.—349, Leigh Rd., Howe Bridge, Atherton, near Manchester. [X7409

Auto-Wheels.

AUTO-WHEEL, perfect condition, spare tyre unused; £7/10.—Rainger, Farringdon, Alton, Hants. [X7367

MOTOR CYCLES FOR SALE.

Auto-Wheels

AUTO-WHEEL, new condition, only ridden few days; £8, or best offer.—Box 765, c/o *The Motor Cycle.* [X7313

AUTO-WHEEL, perfect order, £6, with Raleigh cycle £8/10.—Pearce, Woodmancote, Cirencester. [9203

AUTO-WHEEL, genuine B.S.A. model, quite equal to new; £7/10, great bargain.—Bunting, Mason's Av., Harrow. [9296

AUTO-WHEEL (Wall), good going order, mag.; accept £5/10; owner called up.—Clarke, Furnisher, 74, Overstone Rd., Northampton. [X7356

3½h.p. Auto, good condition, new belt, lamp sets, and 2 push-in tube; £10, cheap for quick sale.—Rendell, Tarrant Monkton, Blandford. [X7413

Bat.

BAT, 1912, 6h.p. T.T., 3-speed model, fast bike, good condition; £32.—P. J. Evans, John Bright St., Birmingham. [X7485

BAT, 6h.p., kick start, 2-speed, clutch, XL pan seat, 65×65, accessories, excellent condition; £40. —6, Compton Terrace, Wickford. [9190

BAT-J.A.P., 8h.p., 1913, spring frame, 2 speeds, clutch, with 1915 improvements by makers, latest heavy Druids, in good order, £42; sidecar, £3; or exhange 4h.p. B.S.A. or A.J.S.—Campbell's Garage, Golspie. [X7414

Bradbury.

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage; £49/10.—Motor Exchange, Horton St., Halifax. [8887

BRADBURY, 3h.p., just overhauled; owner joining up; £8/10 only, quick sale; particulars, photo, stamp; offers.—Basevi, Malmesbury. [X7491

BRADBURY, 3½h.p., 1913, 2-speed, and Millford sidecar, overhauled; £35; extended payments arranged.—Service Co., 292, High Holborn, London. [X7428

1914 6h.p. Bradbury Coachbuilt Combination, countershaft 3-speed gear, kick starter, speedometer, Lucas lamps, etc.; sacrifice £48.—Twinn, 285, High St., Brentford. [8829

BRADBURY, 1912, 3½h.p., N.S.U. gear, wicker canoe sidecar, lamps, horn, etc., good running order, good tyres; seen any time; £25, or offers.—W. Webster, East Tilbury, Essex. [9073

Brown.

BROWN, 3½-4h.p., m.o.v., good tyres, runs well; £6/15.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [9159

B.S.A.

1917 B.S.A.'s in stock.—Lambert's, Thetford. [9154

B.S.A., 1917 models H and K, with sidecars, in stock. —Moss, Wem. [X7495

1917 B.S.A., chain drive; in stock.—Pickering, Mardol, Shrewsbury. [X6775

COLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A., 3½h.p., T.T. Model, free engine, perfect condition; bargain, £35.—58, Somers Rd., Worcester. [X7390

B.S.A., 1912, 2-speed, head lamp, horn, accessories, excellent condition; £30.—Davies, Troedrhiwffenyd, Llandyssul. [X7379

B.S.A.—1917 Model H and K in stock; cash or deferred payments. — Jones, Garage, Broadway, Muswell Hill. [9313

B.S.A., 1914, 3½h.p., splendid condition, new B. and B., accessories; £26/10.—73, Priolu Rd., Charlton, S.E. [9283

B.S.A., 1917 H and K Models in stock for immediate delivery; exchanges entertained.—Eagles and Co., High St., Acton, London. [X7450

B.S.A., 1916, all chain, overhauled, all accessories; £55; extended payments arranged.—Service Co., 292, High Holborn, London. [X7429

B.S.A., late 1913, 2 speeds, and free engine, with Millford sidecar, accessories, only used week-ends; £39. —Wells, Butcher, Wanstead, Essex. [9142

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529

B.S.A., 3½h.p., 1912 free engine model, with T.T. handle-bars, excellent condition, new appearance; £26/10.—Eagles and Co., High St., Acton, London. [X7448

B.S.A., 4¼h.p., 1915 model K, 3-speed countershaft gear, with Millford Corvette sidecar to match, accessories; £57.—Eagles and Co., High St., Acton, London. [X7447

1916 B.S.A. K Model, 3½h.p., 3-speed, complete with sidecar, used one month; owner in France; accept 65 gns.—Apply, Mrs. Harpham, Pentheyn, Camerley. [X7392

B.S.A. Motor Bicycles, chain and chain-cum-belt models in stock.—A. Watkins, The B.S.A. Agent, 50, Stoney Lane, and 565, Stratford Rd., Sparkhill, Birmingham. [X7440

B.S.A., 3½h.p., 1912-13, free engine model, Dunlop heavy tyres (unscratched), N.S.U. 2-speed gear, with adjustable pulley, accessories; £30.—Eagles and Co., High St., Acton, London. [X7449

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SIDECAR OUTFITS.

TRIUMPH, 3½ h.p., 2-speed countershaft, Sidecar ... £30
ZENITH, 1914, 6 h.p., countershaft clutch model £50
RUDGE, 1913, 5-6 h.p. Multi, with Rudge Sidecar £40
ENFIELD, 6 h.p., 2-speed, twin, Enfield Sidecar £29
RUDGE, 1913, 3½ h.p. Multi, coach-built Sidecar *£30
SCOTT, 1914, 3¾ h.p., 2-sp., and Scott sidecar £47
ZENITH, 1915, 3½ h.p., twin, clutch, and C.B. Sidecar £45
P. & M., 3½ h.p., 1913, 2-speed, C.B. Sidecar *£40
JAMES, 4½ h.p., 1914, 3-speed, Empress Sidecar *£45
SUNBEAM, 1915, 3½ h.p. Combination *£68
SUNBEAM, 1916, 3½ h.p. Combination £77
ZENITH, 1914, 8 h.p., clutch, and Sidecar.....*£60

LIGHT CARS, Etc.

G.W.K., 1914, 8 h.p., just re-painted £120
KNIGHT Junior, 1914, 11.9 h.p., sporting body *£145
SINGER, 1913 (late), 5 lamps, dickey *£140
HILLMAN, 1915, 9.5 h.p., speedometer, little used.*£215
MATHIS, 1914, 15 h.p., 5-seater, dynamo .....*——
SWIFT, 1915, 10 h.p., dynamo, like new.....*£250
SELSIZE, 1912, 10-12 o.p., dyoamo *£135
FORD, 1913, 20 h.p., 5-seater, windscreen £60
MORGAN, 1913, 8 h.p., hood and screen.....*£60
CALTHORPE, 1916, 10 h.p., 4-seat, dyna. and start £265
CALTHORPE, 1916, 10 h.p., 4 seat, dyna. and start £275
A.C., 1915, 10 h.p., dynamo, luxurious finish £275
HUMBERETTE, 8 h.p., 1913, waats overhauling £36
SINGER, 1914, 10 h.p..... £180

SOLO MOUNTS.

DOUGLAS, 1914, 2¾ h.p., 2-speed, T.T. *£35
DOUGLAS, 1915, 2¾ h.p., 2-speed, model V..... £45
DOUGLAS, 1914, 2¾ h.p., 2-speed *£40
DOUGLAS, W. O., 1916, 2¾ h.p., 2-speed £50
TRIUMPH, 1912, 3½ h.p., clutch model, Bosch *£25
TRIUMPH, 1914, 4 h.p., 3-speed, Bosch.....*£40
TRIUMPH, 1912, 3½ h.p., Standard touring *£22
TRIUMPH, 1913, 3½ h.p., 3 speed, all accessories ...*£30
TRIUMPH, 1914, 4 h.p., 3-speed (late date) *£42
TRIUMPH, 1909, 3½ h.p., delivered 12.12.08 ..... £17
TRIUMPH, 1914, 4 h.p., 3-speed, electric horn *£41
INDIAN, 1914, 7-9 h.p., clutch model, speedometer .*£40
INDIAN, 3½ h.p., 1915, 3-speed, speedometer £38
INDIAN, 1914, 7-9 h.p., T.T. model, very fast *£36
B.S.A., 1916, 4½ h.p., 3-speed, mod. K., speedometer*£54
ENFIELD, 1911, 2¾ h.p. twin, 2-speed, chain drive..*£20
ENFIELD, 1911, 2¾ h.p. twin, Grado gear *£14
HUMBER, 1914, 3½ h.p. 3-speed, water-cooled *£38
CALTHORPE, 1914 (late), 2½ h.p., 2-sp., 2-str. *£22
REX, 1914, 4 h.p., 2-speed, and handle start £25
PREMIER, 1913, 2½ h.p., single-cyl., fine lightweight .. £12
F.N., 1912, 2½ h.p., 2-speed, shaft drive £12
CALTHORPE, 1914, 2 h.p., 2-speed, 4-stroke £15

Machines starred (*) are complete with lamps, horn, etc.

NEW 1917 MODELS.

ROYAL ENFIELD, 2¼ h.p., 2-speed, 2-stroke £44 2
B.S.A., 4½ h.p., 3-speed, belt, K, 1917 model £64 0
B.S.A., 3½ h.p., Model D, T.T. £52 10
ROVER, 1917, 3½ h.p., T.T., Philipson pulley ... £61 10
HARLEY-DAVIDSON, 7 h.p., 17F, 3-speed £93 0
HARLEY-DAVIDSON, 7 h.p., 17J, electric equip...£102 0
HARLEY-DAVIDSON Sidecar to either of above.. £24 10

NEW 1916's.

(Note Reduced Prices.)

ROYAL RUBY, 2½ h.p., 2-speed, J.A.P. engine.... £33 14
ROYAL RUBY, 2¼ h.p., 2-speed, 2-stroke £32 5
ROYAL RUBY, 2¼ h.p., J.A.P., single-speed £28 15
COVENTRY EAGLE, 2½ h.p., single-speed, 2-stroke £30 15
LEVIS 2 h.p. Popular model £29 0

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B.S.A.

B.S.A., 1916, 4¼h.p., 3-speed countershaft Model H, all chain drive, with special commercial sidecar, suitable for baker, accessories, also ordinary sidecar body; £78.—Below.

B.S.A. Latest New Models in stock; chain-cum-belt Model K, £64; sidecars in stock to fit from 10 gns.; your present machine can be taken as part payment.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0551

Calthorpe.

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799

CALTHORPE-J.A.P., late 1915, Enfield 2-speed gear, and accessories, lovely condition; £26.—Moss, Wem. [X7499

1916 2¼h.p. Calthorpe, 2-speed, 2-stroke, with horn, perfect condition; £28.—24a, Dartmouth Rd., Forest Hill. [9245

1916 Calthorpe-Jap, 2¾h.p., Enfield gear, excellent condition; 26 gns.—Woolfe, Oakcroft, King Charles Rd., Surbiton. [9215

1917 Calthorpe, 2-stroke, 2-speed, new; also 1915 Calthorpe-Jap, second-hand, £26.—Pickering, Mardol, Shrewsbury. [X6778

1915 Calthorpe-Jap, 2¾h.p., Enfield 2-speed, lamps, horn, footboards; £25; exchanges.—Newnham, 223, Hammersmith Rd., W. 'Phone: 80. [9331

CALTHORPE-J.A.P., 1917, latest model, Enfield 2-speed, just arrived from works; 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9116

CALTHORPE, 2-stroke, 1917, latest model, Enfield 2-speed; 33 gns.; just arrived from works.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9118

CALTHORPE-J.A.P., new, but slightly shop-soiled, Enfield 2-speed; special bargain, 34 gns., usual price 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9117

CALTHORPE, 2-stroke, new, but slightly shop-soiled, Enfield 2-speed; special bargain, 29 gns., usual price 33 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9119

P. J. EVANS, Birmingham and District Agent.—Calthorpe 1917 models in stock; two-stroke and four-stroke lightweights, and 4-5h.p. twins, solo or as combination.—John Bright St. [X7481

CALTHORPE-J.A.P.'s, 2-speed models in stock, 38 gns.; deferred terms if desired; also 1915 2-speed and accessories, fine order; £27/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [9129

Campion.

LATE 1915 Campion and Sidecar, 5-6h.p. J.A.P. engine, chain drive, 3 speeds, kick starter, best accessories; £65.—52, Millhouses Lane, Sheffield. [9228

Chater-Lea

CHATER-LEA, 8h.p., genuine No. 7 combination, 3-speed gear, good condition; £35.—Verney, Dorking. [9214

CHATER-LEA, 2¾h.p., 1915 Villiers engine, 2-speed countershaft gear, T.T. handle-bars; £26/10.—Eagles and Co., High St., Acton, London. [X7445

Chater-Lea-Precision.

CHATER-LEA-PRECISION, 3¾h.p., 1913, specially built, excellent condition; accept £17.—Wright, 28, Addison St., Nottingham. [X7418

Clyno.

CLYNO 1912 6h.p. Combination, £35/10; Clyno, 6 h.p., 3 speeds, £24/10.—Motor Exchange, Horton St., Halifax. [8888

CLYNO 2-stroke, 1915, 2-speed, clutch, recently overhauled, excellent order; bargain, £25.—Ussher, Moor House, Hawkhurst. [X7315

CLYNO, 1914, No. 6 sidecar, recently overhauled, guaranteed; £65; extended payments arranged.—Service Co., 292, High Holborn, London. [X7430

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

PETROL Free with 1914 Clyno coachbuilt combination, detachable wheels, 3-speed, electric lights; 52 gns.—Rider Troward, 78, High St., Hampstead. [8980

CLYNO, 1915, 3-speed, Lucas lamps, Jones speedometer, done 3,500 miles, coachbuilt sidecar, excellent condition; bargain, £58; owner joining up.—Davies, Llwyneos, Llandyssul. [X7378

1914 Clyno Combination, 3-speed, clutch, kick starter, spare wheel, hood and screen, new tyres, little used, condition as new; £65.—Davey, Golden Eagle Hotel, South Reddish, Stockport. [X7460

Connaught.

CONNAUGHT 1916, 2¾h.p., 2-stroke, fitted Dunlop tyres and new belt, guaranteed perfect condition, not been used for 6 months; £20.—27, Woodbridge Rd., Moseley, Birmingham. [X7506

BIRMINGHAM Agent, P. J. Evans, John Bright St.—1917 models of the famous Connaught two-stroke, standard 2¾-3h.p. models, either solo or with sidecar; miniature models, single or 2-speed countershaft gear; prices from 27 gns. [X7483

MOTOR CYCLES FOR SALE.

Coventry Eagle.

COVENTRY Eagles, 2½h.p., single-speed, £37; 2-speed and free engine, £44/2; in stock for immediate delivery; easy purchase terms if desired.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [9321

Dalm.

DALM, 1916, 2-stroke, 3h.p., complete with lamps, horn, etc., as new; price £24.—46, Lady Margaret Rd., Southall. [9091

De Dion.

DE DION, 4h.p., and sidecar, good tyres, mag., B.B., £14, or nearest offer; also twin coil and Midget trembler, at 6/- each; on view after 6 p.m.—72, Beechfield Rd., Tottenham. [9224

Douglas.

DOUGLAS, 1914, 2¾h.p., 2 speeds, T.T., speedometer; £35.

DOUGLAS, 1915, 2¾h.p., 2 speeds, T.T., speedometer; £42.

DOUGLAS, 1914, 4h.p., 2 speeds, disc wheels, in nice condition; £42.—Percy and Co., 337, Euston Rd., London. [9261

1912 Douglas, 2¾h.p.; £16.—Godfrees, 124, Romford Rd., Stratford, E. [9086

1914 Douglas, 2 speeds, complete; £35.—Cross, Effingham Sq., Rotherham. [X7466

1912 Douglas, T.T., 2¾h.p., 2-speed; £22.—47, Barrington Rd., Crouch End. [9164

DOUGLAS, 1913, T.T., twisted frame, quite rideable; nearest £20.—Davis, Twyford, Berks. [X7383

1913 T.T. 2¾h.p. Douglas, 2-speed, tyres as new; 30 gns.—Railway Garage, Staines. [9309

1913 Model N. Douglas, first-class order; £30, or near offer.—Gray's Garage, Guildford. [9275

DOUGLAS, 1913 Model U, excellent condition, low mileage; £28.—234, Woodstock Rd., Oxford. [X7473

DOUGLAS, 1911, wants slight overhauling, tyres in fair condition; £9.—Stoner, Aylsham, Norfolk. [9220

1914 (late) Douglas, Model V, most carefully kept, exceptional condition; £40.—Railway Garage, Staines. [9310

DOUGLAS, 1914, 2¾h.p., T.T. model, with accessories; £42/10.—Motor Exchange, Horton St., Halifax. [8889

1912 2¾h.p. Douglas, 2-speed, good tyres, engine overhauled; £28.—Robinson's Garage, Green St., Cambridge. [9239

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat Yeovil. Tel.: 50. [5855

DOUGLAS, 2¾h.p., 1913, 2 speeds, nearly new Dunlop tyres, complete equipment; £28.—W. P. Edwards, Taunton. [X7076

COLMORE Depots, Birmiogham, Munchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

DOUGLAS, 2¾h.p., T.T., very fast, special hill-climber, use paraffin; £30.—Meeson, 35, Park St., Islington, London. [9176

1915 2¾h.p. 2-speed Douglas, in good condition, and accessories; £42; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [9103

DOUGLAS, late 1913, 2¾h.p., 2-speed, little used, faultless condition; £30; exchange entertained.—Coulsdon, King Charles Rd., Surbiton. [9265

DOUGLAS, 1911, twin, tyres excellent, Bosch, head lamp, good condition throughout; £16, or near offer.—Box L3,280, c/o *The Motor Cycle*. [9297

DOUGLAS Specialists.—Gibb, Gough, London Rd., Gloucester. Gibb, the International Douglas rider, winner of numerous cups and gold medals. [2218

DOUGLAS, 1914, 2¾h.p., T.T., Bosch, Lucas lamp, Cowey, perfect, property of officer Overseas; £39; no dealers.—Box L3,279, c/o *The Motor Cycle*. [9126

DOUGLAS, 1914, 2-speed, with accessories; £39/10; deferred terms if desired.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [9132

1913-1914 T.T. Douglas, 2-speed, kick starter, clutch, as new; any trial willingly; £34; only wants seeing.—Baines, Red House, Sawbridgeworth, Herts. [X7314

DOUGLAS, 2¾h.p., T.T. Model, 1913-14, re-enamelled and plated, overhauled, new tyres; £35; accessories.—Eagles and Co., High St., Acton, London. [X7442

DOUGLAS, 1914, 2-speed, free engine, not used last year, and guaranteed mechanically perfect, nearly new tyres and belt; £40.—31a, Broomfield Rd., Chelmsford. [X7470

1915 Douglas, 2¾h.p., T.T. Model, all black, 2-speed, speedometer, Sparton horn, acetylene lighting, faultless condition; £45.—2, Abbey Court, Abbey Rd., N.W. [9163

£35.—1913 2-speed 2¾h.p. Douglas, lamps, horn, new spare tyre, tubes, and belt, perfect condition; bargain.—68, Englefield Rd., London, or 'Phone 2980 Dalston. [9253

DOUGLAS, 1913, 2¾h.p., 2 speeds, clutch, and kick start, tyres good as new, and new lamps, fine condition, and very fast; £27.—Apply to 13, Grant St., Plaistow, E. [9080

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4½ h.p. B.S.A., belt-cum-chain	£64 0
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2½ h.p. LEVIS, Popular model	£32 0
3½ h.p. ARIEL, 2-sp., solo, kick-start	£65 10
2¾ h.p. CALTHORPE-J.A.P., 2-sp., feather-weight, 2 models in stock	£39 16
2½ h.p. NEW HUDSON, Model C, 2-speed	£35 0
7-9h.p. HARLEY-DAVIDSON, Mod. 16F, 1916, and Sidecar	£102 9
2½ h.p. ROYAL RUBY, single-speed	£47 5
2½ h.p. ROYAL RUBY, 2-speed	£40 0
2½ h.p. ROYAL RUBY, 2-speed J.A.P. .. (7 models in stock.)	£46 0

SECOND-HANDS.

6 h.p. ENFIELD 1916 Tradesman's Outfit, as new	£90 0
ENFIELD 1916 Commercial Box Carrier ..	£12 12
2½ h.p. T.D.C., 1916, 2-sp., original tyres still on, spare tank	£25 0
2½ h.p. ALLDAYS ALLON, 2-sp., clutch, all accessories	£36 10
2½ h.p. COVENTRY-EAGLE, 2-sp., 2-str., special price	£39 10
2½ h.p. JUNO-VILLIERS, 1916, all access., mileage about 100	£33 10
4¼ h.p. JAMES, 1915, 3-sp., k-start, lamps, horn	£57 10
2½ h.p. ALLDAYS ALLON, 1915, single-sp., and accessories	£27 10
1 h.p. AUTO-WHEEL, B.S.A. model	£7 10
1 h.p. AUTO-WHEEL, Standard model..	£12 12
2¾ h.p. CALTHORPE-J.A.P., 1915, 2-sp., and accessories	£27 10
2½ h.p. LLOYD-VILLIERS, 1916, single-sp., with lamp, horn	£31 0
2½ h.p. O.K. JUNIOR, 1916, 2-sp., tail lamp, horn, Miller lamp	£28 10
4 h.p. TRIUMPH, 1914, 3-sp., lamp, horn, speedometer	£42 10
2¾ h.p. NEW HUDSON, 1912, 3-sp. J.A.P., lamps, horn	£18 10
3½ h.p. ROVER, 1913, Philipson pulley, 2 lamps, horn, very fast	£35 10
2¾ h.p. DOUGLAS, 1914, 2-sp., T.T. bars	£39 10
4 h.p. 1910 TRIUMPH, 2-sp. N.S.U., new Dunlop tyres, P. & H. lamp, horn, speedometer	£22 10
6 h.p. 1916 ENFIELD Com., Lucas access., 3 lamps, speedometer	£85 0
2 ENFIELD Box Carriers, each	£15 15
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Douglas.

DOUGLAS, 1913-1914, 2¾h.p., 2 speeds, clutch, kick starter, tyres, tubes, and belt as new, newly enamelled, and in perfect order; £28.—Hawthorn Villa, Shettleston. [X7200

DOUGLAS, 2¾h.p., Model U, 1915, 3-speed gear, footboards, upturned or touring bars, lamps, horn, speedometer, in perfect order; £45.—Robinson's Garage, Green St., Cambridge. [9242

DOUGLAS, 2¾h.p.—Brand new Models W (clutch, kick start) and U; deliveriss in few days to doctors and farmers. Write for particulars.—Robinson's Goroge, Green St., Cambridge. [9243

1914 Douglas, 3½h.p., 2 speeds, clutch, kick stort, 2 lamps, and horn, Bosch, Amac, and 1916 Douglas sidecar, combination in good order; £55; after 8.30 evenings.—86, Waverly Rd., Southsea. [9273

DOUGLAS, 1913, single-geared, fitted 1912 new cylinders, pistons, footboards, fitted for and runs well on substitute, good tyres, perfect condition throughout.—Jacques Court, Elham, Canterbury. [9137

LATE 1914 Douglas, T.T., 2-speed, 2¾h.p., lamps, speedometer, Palmer tyres, long exhaust pipe, Brooks B170, good condition; £36.—Nelson, Limpsfield, Winchester St., S. Farnborough. [9275

DOUGLAS, 1913, 2¾h.p., 2-speed, tyres nearly new, P. and H. head lamp and generator, rear lamp, horn, spare belt and tube case; £31.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9122

DOUGLAS Combination, 1915, 4h.p., 3 speeds, clutch, kick starter,-Douglas sidecar, lamps, horn, speedometer, spare tyre and tube, in excellent order; seen any time; £60.—56, Ashley Gardens, S.W. [9195

DOUGLAS (1914), 2¾h.p. Model U, 2-speed gear, footboards, lamp, horn, speedometer, run under 90 miles, belonged deceased officer who purchosed July, 1914; £42/10.—Neill, 93, High St., Arbroath. [X7391

1916 4h.p. Douglas Combination, 3-speed, clutch, hood, wind screen, mat, lamps, ridden once only from works to London; what offers?—25, Agate Rd., Hammersmith. 'Phone: 747 Hammersmith. After 6 p.m. [X7402

LATE 1915 Douglas 2-speed T.T. Colonial Model, all black, large, long extended exhaust pipe, Lucas horn, P. and H. head (large), rear lamp, etc., foot board or foot-rest optional, in real good order, guaranteed perfect; £45.—Jones, Garage, Broadway, Muswell Hill. [8768

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012

EDMUND, 1916, 2½h.p. J.A.P., Enfield 2 speeds, spring frame; £35.—Morgan, c/o Red Cow, Crown St., Reading, Berks. [X7321

Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2¼h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

ENFIELD 3h.p. Twin, 1914, guaranteed; £38/10.—Service Co., 292, High Holborn, London. [X7431

1917 Model 3h.p. Enfield, almost new, fully equipped; 41 gns.—245, Hammersmith Rd., London, W. [9177

1912 6h.p. Enfield 2-speed Combination, accessories; bargain, £33.—Blake, 216, Westbourne Grove, W. [9299

1916 Enfield 6h.p. Combination, only ridden few miles, like new; 75 gns.—29, St. Leonard's St., Bow [9207

ENFIELD Combination, 6h.p., 2-speed, new tyres, etc., overhauled; £60.—Smith, 199b, King St., Hammersmith. [9217

1917 3h.p. Enfield, T.T., 2 speeds, as new, only done 10 miles; £50.—W. Milner, 65, East Parade, Heworth, York. [9065

6h.p. 1914 Enfield Combination, excellent order, guarantee given; £45.—71, Sisters' Av., North Side, Clapham. [9223

ENFIELD, 1917, 3h.p.; 55 gns.; just arrived from works.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9114

ENFIELD 1916 6h.p. Combination; a bargain, £68/10.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9112

3h.p. Enfield, Nov. (1915), done 150 miles, stored since, unscrutched; £41, or offer.—Box 768, c/o *The Motor Cycle*. (D) [X7381

1915 Enfield, T.T. 3h.p. twin, 2-speed, kick starter, Binks, good condition; £30.—4, North Side, Wandsworth Common, S.W. [9199

ENFIELD 1916 6h.p. Combination, done under 3,000 miles; bargain, £62/10.—Carmarthen Automobile and Posting Co., Nott Sq. [X7511

ENFIELD 1917 6h.p. Combination; 90 gns.; just arrived from works.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9113

1917 3h.p. Enfield, twin, new Lucas accessories; bargain, £50; combination required.—M., 5, Rugby Mansions, W. Kensington. [9185

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Enfield.

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock or immediate delivery.—See below.

1917 6h.p. Enfield Coachbuilt Combination, with apron and mat, 2 speeds, clutch and starter, 90 gns.; extra for hood and screen, £4/19; Lucas lighting set, 15 gns.—Below.

1917 3h.p. Enfield, solo or sidecar mount, 2 speeds, clutch, and kick starter; 55 gns.; sidecars from gns.—Below.

1917 Enfield Two-stroke, 2¼h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright t., Birmingham. [X7480

ENFIELD Lightweight Twin, mag., spring forks, runs well; £12/15.—Wandsworth Motor Exchange, bner St., Wandsworth (Town Station). [9155

1913-14 Enfield Combination, coach sidecar, £57/10; 1912 Enfield combination, cane sidecar, £41/10.—ollier's Motories, Deal St., Halifax. [8890

3h.p. Enfield, 1915, new condition; sell, or exchange, with adjustment, for 1915 4h.p. good make, peeds, clutch.—H. Rowdon, Lyndhurst, Hants. [9230

ENFIELD 1916 (late) Combination, all lamps, etc., could not tell from new; an absolute bargain, 82:—Jones, Garage, Broadway, Muswell Hill. [9314

1913 6h.p. Enfield Combination, excellent condition, very little used; owner in army; best offers ac-pted.—28, Wanstead Park Av., Manor Park. [9277

ENFIELD 1917 6h.p. Standard Combination, £94/10; 2-seater sidecar £3 extra.—Lamb's, 151, High St., Valthamstow, and 50, High Rd., Wood Green. [9130

ENFIELD 1916 Combination, lamps, horn, screen seat, done 160 on 2 gallons 3 up; £78; perfect; part solo.—Turville, Grosvenor Hill, Margate. [9183

ENFIELD Combination, with Lucas dynamo lighting set, new September, not run 500 miles, indis-inguishable from new; 100 gns.—Moss, Wem. [X7498

ENFIELD Combination, 6h.p., 1916, fully equipped, and only run a few hundred miles; £80.—Long-an Bros., King St., Acton. 'Phone: 1578 Chiswick. [9225

ENFIELD, 3h.p., 1916, lamps, horn, speedometer, done 2,500, splendid condition; £40; can be seen aturday 5 p.m. to Monday 1 p.m.—49, New Rd., Ware, lerts. [X7380

ENFIELD 6h.p. Combination, new, but slightly shop-soiled; special bargain, £84/10, usual price £94/10. -Wilkins, Simpson, and Co., 11, Hammersmith Rd., ondon. [9111

1915 2½h.p. 2-stroke Royal Enfield Lightweight, Palmer tyres, guaranteed in perfect condition hroughout; £25.—The Premier Motor Co., Aston td., Birmingham. [9232

3h.p. Royal Enfield and Coachbuilt Sidecar, in splendid condition, powerful and fast machine; rice £37/10; the combination guaranteed.—Wau-hope's, 9, Shoe Lane, London. [9249

ENFIELD, 1917, 2-stroke, £44/2; just arrived from works; we are Enfield specialists; immediate de-ivery; all models in stock.—Wilkins, Simpson, and o., 11, Hammersmith Rd., London. [9115

3h.p. Enfield Combination, with speedometer, Lucas lamps, Lucas horn, standard equipment of tools, tc., cost £104 a short time ago, has only run 400 iles, and is like new in every respect; a bargain, £95; asy purchase terms if desired.—Harrods, Ltd., Motor ycle Dept., Brompton Rd., S.W. [9318

Excelsior.

AMERICAN Excelsior, 7-9h.p., 3-speed, clutch, kick starter, brand new, with Empire sidecar, almost ew; £80; exchanges.—Service Co., 292, High Holborn, ondon. [X7427

EXCELSIOR, 1916, 2¾h.p., 2-stroke, 2 speeds, beautifully equipped, equal to new; cost £46, acrifice £25, or near.—436, Whitehorse Rd., Thornton eath. [9187

AMERICAN Excelsior, brand new, 7h.p., 3-speed, actually in stock for immediate delivery, com-lete with Montgomery coachbuilt sidecar enamelled match; £90; lists free; liberal exchanges.—To be btained only from the Premier Motor Co., Aston td., Birmingham. [9231

F.N.

F.N., 4-cyl., F.E., 2-speed gear, dropped frame, elec-tric lights, excellent condition; £25.—Mitchell, 54, Grosvenor Rd., S.W. [9192

Grandex.

RIDER TROWARD'S, 78, High St., Hampstead.—Grandex-Precision, 4h.p., T.T., 1917, new, 31 gns.; randex-Villiers, 1917, 2-speed, new, 31 gns. [8992

Harley-Davidson.

HARLEY-DAVIDSON Combination, new, in stock.—Pickering, Mardol, Shrewsbury. [X6776

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for im-mediate delivery 1917 Harley-Davidsons. [7863

BRAND New H.D., 16F, 7-9h.p., not yet unpacked, £79; H.D. 11F, 1916, with Canoelet S.C., perfect, 80.—Young, South Bank, Yeovil. [9096

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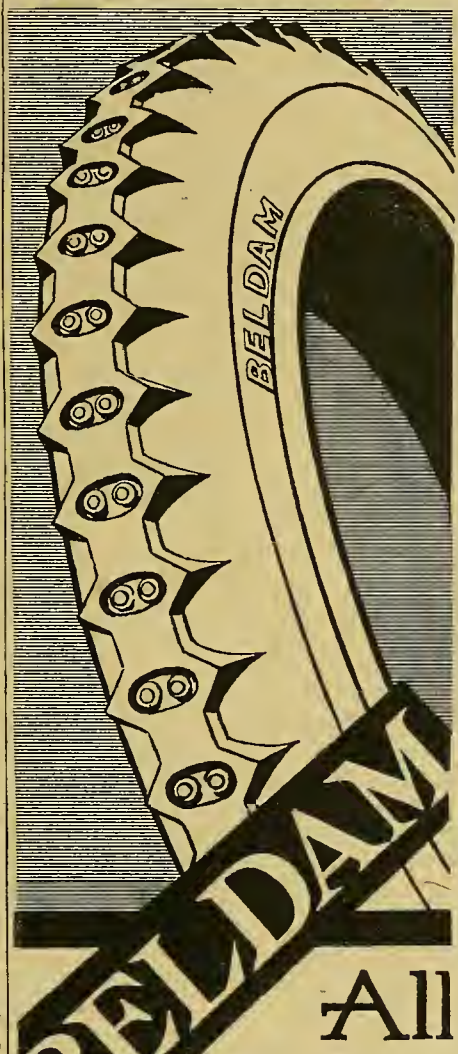

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Harley-Davidson.

LATE 1915 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea [0861

HARLEY-DAVIDSON, 1916, 7-9h.p., 16F model, F.R.S. lamps, Canoelet coach sidecar, like new, only ridden few miles; 80 gns.—29, St. Leonard's St., Bow. [9206

HARLEY-DAVIDSON, 7-9h.p., late 1916, Canoelet coachbuilt 2-seater sidecar, lamps, horn, hood screen, practically new; £80.—Guest, Fern Villa, Warwick Rd., Solihull [X7386

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INDIAN 7-9h.p. Road Racer, 1914, perfect; £45.—Young, South Bank, Yeovil [9097

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INDIAN 1916¾ Powerplus Combination, run 80 miles only, scarcely soiled or scratched; £90, a real bargain.—Percy and Co., 337, Euston Rd., London. [9256

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Substitutes by Permit.

PETROL substitutes and the best way to use them have been very much to the fore of late, and for a variety of reasons. These substitutes are for the most part slightly cheaper than petrol; some riders find that, with suitable means of vaporising, they give results which compare well with those obtained from the lighter fuel; the mileage per gallon should be slightly better, and, lastly, many riders required a larger allowance of fuel than their petrol cards gave them.

Since the notice issued by the Petrol Control Committee on March 10th, the last reason no longer holds good, for the substitute has to be entered on the purchaser's card in the same way as petrol—and presumably it will, therefore, be subject to the tax of 6d. a gallon paid by the rider to obtain his card, if not to the former petrol tax which is included in the price. This notice is, of course, issued because it is just as difficult to import substitutes as petrol, and the tonnage required will in each case be the same, but there must be large stocks of substitutes ready in the country, and it is desirable that these should be used to the best advantage.

Users' experiences have been chronicled in these columns for months past and valuable advice proffered by readers, supported by expert writers, as to desirable forms of vaporisers, and these will prove valuable for reference. But, as a leading agent (Mr. F. S. Whitworth) points out in a communication appearing on another page, what is wanted is a committee of practical men, including manufacturers, to co-ordinate these amateur efforts, and by test and collaboration decide upon the most suitable form of vaporiser for specific makes of motor cycles. Doubtless were the conditions more propitious such a committee could readily be formed, but as it is we fear the question must be deferred until after the war.

It may be well here to remark that the majority of different designs of vaporisers reviewed in *The Motor Cycle* have been actually tested on the road in conjunction with heavy fuels; in other words, they are not paper designs based upon mere assumption.

Eliminating Weaknesses.

IN a recent issue we made some remarks on the subject of the design of military model motor cycles, particularly concerning the recurring troubles on designs which existed prior to the outbreak of war. Our main point was that these weaknesses could well be eliminated at the root under a proper scheme, and thus the workshops at the different battle-field bases would be less occupied with unnecessary repair work and the men obviously left free for other more pressing needs. Since our notes were published other information has reached us which shows that our remarks were timely. The point now emphasised is the question of the supply of spare parts. One manufacturer has said that his output is actually restricted by reason of the large quantity of spares demanded with every complete unit, the quantity of spares having been laid down from the first and not having been altered. Concerning our previous remarks, it has been pointed out to us that the military authorities refuse to accept certain modifications in design as recommended by the actual manufacturers, for the very good reason that the spare parts difficulty—a very big question when one considers the number of transport bases scattered almost the world over—would become extremely complicated. Evidently then the disease is preferred to the cure for the reasons stated. But that is not a complete answer to our points; we instanced several which do not involve the question of spares. Take one or two only: the most desirable shape of handle-bars, the best position for the footrests to provide the utmost security on treacherous surfaces, and the almost universal demand for handle-bar-controlled clutches.

An index to the advertisements in this issue will be found on the page facing the back cover.

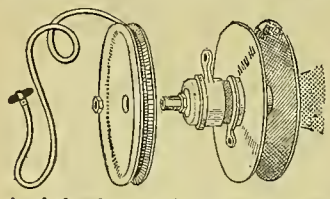
IDEAS: Useful and Ingenious.

A HAND STARTER.

IN a recent issue a correspondent invited suggestions for fixing a starting device to an early model Zenith. It seems, therefore, that the following description of the device as fitted to a reader's Zenith may be of interest to him, and possibly to riders of other machines.

A simple hand starter was made by fixing a pulley on the engine-shaft, actuated by a leather strap as shown in the sketch. A flat was filed on the shaft to take a corresponding flat on the hole in the pulley, and then bolted up tightly by means of the lock nut provided. A five to six inch pulley will be found to give ample purchase, whilst four or five laps of strap give the necessary revolutions for starting.

The end of the strap must not be anchored to the pulley, but merely slipped into a hole drilled in the groove



A simple hand starter for a Zenith actuated by a leather strap.

for that purpose. If a liberal injection be given to free the pistons a sharp pull up on the strap will start the engine with ease.

A PILOT JET.

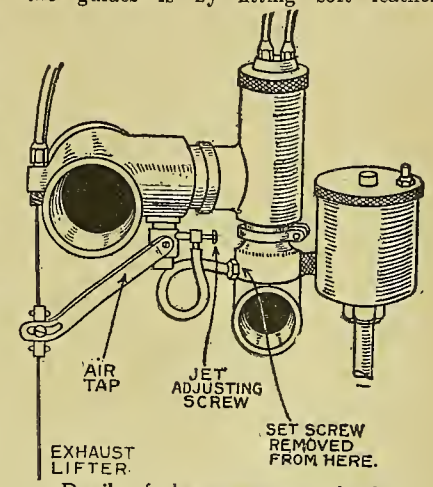
A PILOT jet was made from an ordinary gas by-pass with adjustable aperture. This was fitted into the underside of the induction pipe in such a position as to enable the tap lever to be fixed to the Bowden exhaust lifter wire. The screw which seals the end of the petrol feed channel connecting the float chamber and jet, as fitted to old type B. and B. carburetters, was removed and a small feed pipe connected from this point to the by-pass jet (see sketch).

By adjusting the air lever on the Bowden wire the correct mixture can be obtained for slow running under all conditions. The air supply being operated by the exhaust lifter, cool air is drawn into the cylinders when coasting down hills, etc., thus effectively cooling the engine.

TO ELIMINATE AIR LEAKS

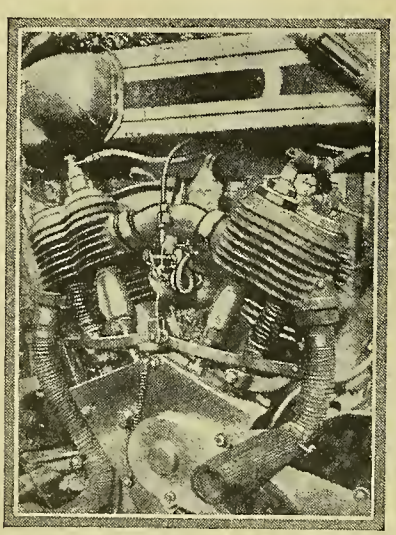
WORN valve guides are invariably the cause of difficult starting and erratic running at slow speeds. Great difficulty is experienced at the present time in obtaining such parts, so in consequence one has to be content with makeshift replacements until the manufacturers can again supply them.

A means of eliminating air leaks at the guides is by fitting soft leather



Details of the arrangement whereby a pilot jet was fitted to a standard B. and B. carburetter.

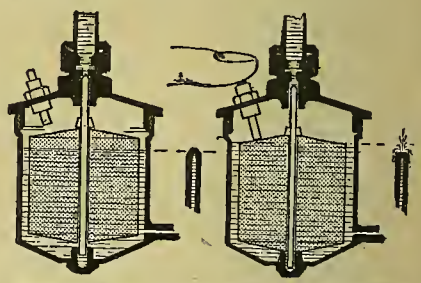
sheaths over the spring and tappet, as in the case of the J.A.P. engine illustrated. These may be made from pieces of old leather gloves placed loosely round the spring, the seam being doubled and stitched closely, the ends being fastened with copper wire.



Leather sheaths fitted over the inlet spring and tappet to eliminate air leaks. Beneath the induction pipe is the pilot jet made from an ordinary gas by-pass.

ECONOMICAL FLOODING.

A GREAT deal of fuel can be wasted by thoughtless and extravagant flooding—especially when it be done several times a day between short runs. Let us think what happens when a carburetter is flooded in the ordinary way. The petrol is turned on, and the needle held out of engagement with its seating till the whole float chamber is full of fuel, and for some seconds—indeed, till the rider is well on his way—petrol is leaking from his carburetter till finally sufficient has run to waste to reduce the supply in the float chamber to its normal level. Now this is clearly a very wasteful way of doing the thing, and, as a general rule, all that is really required in order to effect an easy start is just sufficient overflow from the jet to create a fairly rich mixture in the induction pipe. With a two-stroke engine it is, indeed, unwise to flood in the usual wasteful way, as, if the machine is wheeled forward with petrol still issuing from the jet, liquid petrol is apt to find its way down into the crank case and cause so rich a mixture that finally the engine will not start.



Illustrating the economical and the extravagant way of flooding a carburetter.

The economical way to flood a carburetter, and one which works just as well with most carburetters, is to proceed as follows: Turn the petrol on in the ordinary way, and immediately the float chamber has had time to fill to its normal level, turn the supply off again. Now flood in the ordinary way, that is, by pressing down the float, the displacement of which causes the level to rise above the top of the jet, and thus forces through a good spirt of fuel to do its work. After rapidly depressing the float three or four times the petrol can be turned on again and a start made—no wastage having occurred except at the instant of "ducking" the float.

This procedure is not necessary with a certain carburetter, notably the B. and B., because the plunger consists of a hollow tube. When the end of this tube is closed by the finger it prevents any escape of air from the top of the float chamber, and thus stops the ingress of any petrol beyond what takes the place of that which flows from the jet.

Occasional Comments by "Ixion"

With Somebody Else's Machine!

"SPORTSMAN," writing from H.M.S. *Temeraire*, suggests a novel motor cycling pastime for winter evenings or deep water. Any number can play, and stakes can be arranged to suit every pocket. A motor cycle is put on its stand, and started up. The banker then opens a book on how long the engine will run on full throttle before it seizes. After each seizure a bucket of water is thrown over the cylinder, a new plug is fitted, and the bank is put up to auction for a fresh bout. The wiseacres take particular notice what sparking plug is fitted, as certain makes melt their points off faster than others. My only comments on the above war development of motor cycling are that it must be uncommonly good for trade, and that my engine will not unseize in response to a bucket of water—a barrel of paraffin is more in its line.

Tail Lamp Connections.

THE universal tail lamps are among the few real benefits which we can already put to the credit of the war; and I hope that for once the authorities will show a little commonsense and retain them on all slow-moving vehicles for ever, instead of repeating past blunders, dispensing with them on everything that is overtaken, and enforcing them only on vehicles which overtake. Should they remain compulsory on motor bicycles, it will be up to the trade to invent a decent system. I always use Hunt's Hellesen battery, which is reliable and efficient, though its clips need a little attention—firstly, to adapt it to any given make of carrier or frame; and secondly, to prevent it dissolving under the vibration of unsprung frames. But now and again I bestride one of the abominations fitted with an acetylene tail lamp, a Y metal connector, and some four feet of porous rubber tubing. Considering how little current is required, a dry battery ought to suffice; and dry batteries can be made to all sorts of shapes. It should be an easy matter to fit the ruby lens in a flat panel between the rear cross-bar of the carrier and the back mudguard, and to standardise a dry battery case and spring connections.

Why Black?

ONLY the veterans amongst us appear to have discovered how much more tricky night riding has become since road tarring became so common. In the old days, when macadam was good enough for our traffic, a dry road always shone white under our head lamps, and since all road edgings showed a different and contrasting colour of a subfusc hue, we could follow an unknown road at a tidy gait with considerable ease. When the night was wet conditions altered. The sodden surface showed up darkly, and more care was needed to distinguish the road, since its colour merged into the edging. Now that patent roadstuffs are all the rage, a dry road is usually as hard to pick out as a wet road once was, and the contrast once afforded between dry white macadam and dusky night-shaded hedgerow or stone wall or turf is gone; for all the new roadstuffs are darkish in colour, and most of them are a deep black—so deep that it merges into actual shadow, and one sometimes sees hedges or walls or turf showing up light by contrast. What is needed is a light-coloured roadstuff possessing the weather and traffic-resisting qualities of Tarmac, and such stuffs. Why don't the Road Board offer £10,000 of War Loan as a prize for an invention in this line? There will—I hope I am not too optimistic—be a lot of road reconstruction to be done after the war, and it will be a pity if nothing but black stuff is used. All the tendencies are in the direction of speeding up traffic, and we cannot speed up night traffic while we build black roads, unless, indeed, we fit light edgings to them. The ultimate solution will be a white road which shows white even when it is wet, and yet does not glare on a sunny day in August.

Summer Glare.

I SUPPOSE some old woman will counter my last plea with dreadful stories of a bad attack of conjunctivitis caused by riding fifty miles in blinding sunshine on the old white roads. Well, I have often driven 300 miles and over between sunrise and sunset on a sultry summer day, and while I do not pretend that my eyes did not ache at the finish, I must add that they ache far more after a sixth of the distance covered on tarred roads by night, which is quite the most exhausting job in the way of motor cycling that I have struck. Moreover, half of the summer eye-ache is due to dust; and weak-eyed people can use tinted goggles to counteract both dust and glare in daylight. But nobody has yet invented a goggle which will enable us to get easy vision on tarred roads at night.

THE PRICE OF

THE MOTOR CYCLE *RAISED TO 2d. FROM 22nd MARCH, 1917.*

The price of "The Motor Cycle" will be increased to 2d. per copy commencing with our next issue, dated 22nd inst.

The restrictions on the supply and the greatly increased cost of paper necessitate this step, but the old price of 1d. per copy will be reverted to as soon as circumstances permit.

The subscription rates will be correspondingly raised on renewal or to new subscribers:

British Isles, 10s. 10d. per annum, post free.
All countries abroad, 15s. 2d. per annum, post free.

All subscriptions current at the time of reducing the price to 1d. again will be proportionately lengthened for the benefit of each subscriber.

The Work of Volunteer Motor Cyclists.

Revisions Desirable in the National Motor Volunteer Brown Book.

IN an interesting letter we have received from Mr. S. W. Phillpott, who has long been actively associated with the National Motor Volunteer movement, some very forcible points are brought forward with regard to the work allotted to the motor cyclists as set out in the National Motor Volunteer brown book.

Mr. Phillpott points out that the work given to the motor cyclists is not sufficiently interesting and useful to infuse the men with a desirable degree of enthusiasm. Usually the motor cyclist is a fairly intelligent individual, and to retain his interests work must be given him which will employ his intelligence to a sufficient extent to impress him with the idea that he is doing something worth while. Hitherto the motor cyclists have been used too much as errand boys, their work being of a stereotyped and not particularly interesting nature, requiring little personal initiative, and therefore a scheme has been drafted out by which it is hoped not only to improve the efficiency of the men, but to add point and interest to their work.

Revision of the System.

Mr. Phillpott has for a considerable time had charge of the largest motor cyclist section in England attached to the first and largest heavy car section, so that his opinion on the subject carries the weight of practical experience. The following is an extract from a long letter we have received from him, the references made being to the Liverpool Section:

"The Motor Cycle Section of the Heavy Car Battalion was some time ago separated from the ordinary work of the battalion, and I drafted out and carried through a system of training altogether separate from that laid down; this has incorporated a certain amount of infantry drill (which is necessary to make the men smart, and for teaching discipline) plus a series of lectures and explanations on map reading. In addition, the men have been given mechanical instruction. The section has—through the kindness of one of its members—a ground and buildings devoted to a rifle range, and a drill ground with suitable private rooms for the officers.

"The National Motor Volunteer handbook simply details the motor cyclists as messengers attached to certain officers, but experience has shown that all that is necessary is one despatch rider to be attached to the officer at the head of the column and one at the rear, and, possibly, if a very long column, one or two interspersed. This is, of course, presuming that the whole column is moving as a complete unit.

"The Liverpool Heavy Car Battalion has had attached as many as eighty motor cyclists instead of forty-eight, as shown in the handbook, and these are divided into four squads, territorially, and according to the places of residence of the men. It is therefore possible for them to assemble in squads in their own district, and to travel under their own N.C.O.'s to a centrally situated meeting place, and proceed from there as a complete section when the Heavy Car Battalion is on the move.

Work of the Motor Cyclists.

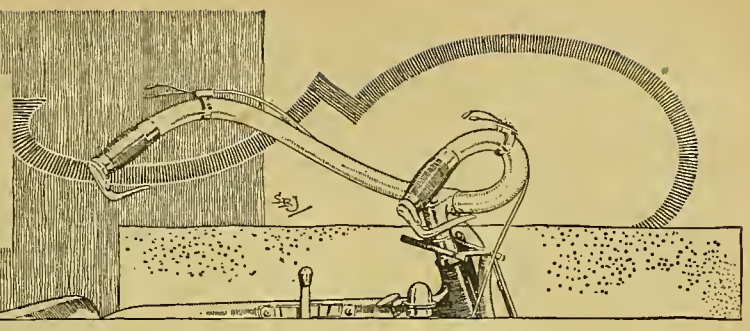
"The motor cycle officer is instructed by the O.C. as to the object point to be reached, and is given instructions by which route the city is to be left. The motor cycle officer, in deputing certain motor cyclists to act as despatch riders with the column, then gives instructions for the rest to proceed to the boundary from which the city is being left—generally this is a tram terminus. One motor cyclist is left behind in case of need to indicate to the O.C., who leads the column, the road from whichever point the column moves to the point of departure from the city. This is only needed if it is a cross town route. Directly the motor cyclist gets the column in sight of the motor cyclists assembled ahead, he proceeds towards the Motor Cycle Section at full speed, whilst as soon as he is perceived approaching the motor cyclist officer gives orders for his column to move off along whichever road he has himself selected as best for the column. The men of the Motor Cyclist Section are then placed at dangerous cross roads and at points where the column might go wrong; each man remains at his post until the whole column has passed, information of which is given him by means of the motor cyclist attached to the rear of the column. Receiving this information he immediately proceeds with all speed past the column and joins the Motor Cycle Section, attaching himself to the rear end. It will be perceived that by doing this a small number of men can be utilised to police or guard the road over a biggish section of country.

The Army Council has granted recognition to the National Motor Volunteers, stating that their primary duty is to provide transport for the volunteer infantry, in connection with which a certain number of motor cyclists are included in the establishment of a motor transport section for duties as despatch riders. Doubtless motor cyclists could be used in other ways, but the Army Council has made no special provision other than the above. However, there seems nothing to prevent volunteer battalions from establishing motor cycle sections for their own convenience to act as scouts and signallers.

Motor Cyclists to Join One Battalion.

"Now the point I have in view is this: that when any town or district with one or more battalion of Heavy or Light Car Motor Volunteers has a sufficient number of motor cyclists, the latter should all be drafted together from the various units into one motor cyclist battalion, which could be drawn upon for motor cyclists by other sections as required. If my scheme were put into force all these men would be bulked together. They would receive uniform training, and would be available as a really large force for any section of the volunteers for which their services were required."

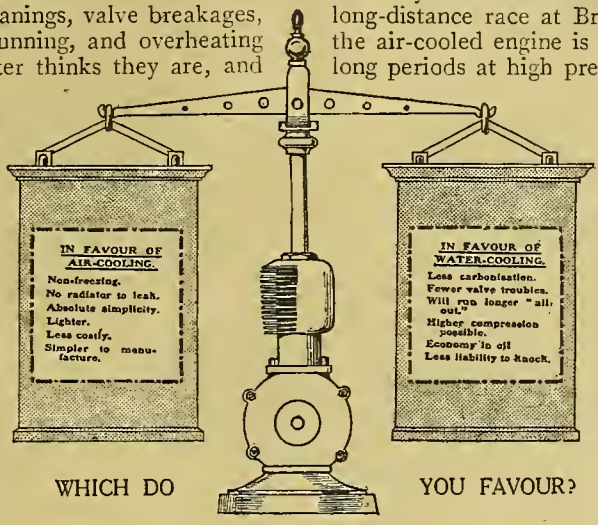
Water-cooling of Motor Cycle Engines.



THE PROS AND CONS OF A MUCH-DISCUSSED SUBJECT.

UP to the present water-cooling on motor cycle engines has not made much progress, but I venture to think we have not seen the last of it. It may be argued that so far we have done well enough without it, that those water-cooled engines the writer has had have not survived for any length of time, and that the success of the air-cooled aeroplane engine is a strong argument against the adoption of the system. Now to all these reasons there are very good answers. Have we done well without water-cooling? Are not cylinder cleanings, valve breakages, losses of power, inconsistent running, and overheating much too frequent? The writer thinks they are, and feels sure that all readers who have had car as well as motor cycle experience will agree. A good high efficiency car engine of good design needs much less attention than a motor cycle engine, and will stand what most of the latter engines will not—driving "all out" for long stretches.

So far I believe I am right in saying that there are only two water-cooled motor cycle engines actually on the market, that is, two which the manufacturers intend to sell after the war. All others have sunk into oblivion. But I do not think that we have by any means seen the last water-cooled motor cycle.



Air-cooling and Aviation.

From accounts I have heard from the technical staff of the Royal Flying Corps the popularity of the air-cooled engine is very much on the wane, as it is being found that it needs far too much attention and fails to meet with as much favour as its water-cooled brother. The Huns' favourite aeroplane motor is water-cooled, and the Hun is a good judge of engines. The subject is a very interesting one, as it practically proves the failure of the air-cooled engine on continuous work. All air-cooled engines which have to work continuously at high pressure eventually fail and give trouble sooner than one which is water-cooled; this has been proved not only on the track, but in the air, and most especially in motor cycle engines used for stationary work in war service. The reason that the motor cycle engine has remained as it is so long is because it is not often asked to give out full power for long periods. The motor cyclist, even if indulging in high speeds, never drives "all out" for any length of time. He is always slowing up for corners, coasting down hills, or easing up for traffic, and these little rests, brief though they may be, are extraordinarily beneficial to the hard-worked engine. The heat from the cylinders falls off very rapidly during these periods of respite. But one has only to consider the heavy "casualty" list in a long-distance race at Brooklands, in order to see that the air-cooled engine is far from perfect when run for long periods at high pressure.

Possibilities in Air-cooling.

I will not go so far as to say that air-cooling is a failure, as this would be absurd, nor do I deny that it is incapable of improvement, as I know of one manufacturer at least who is a great believer in the possibilities of really efficient air-cooling, and is studying the subject with intelligence from the point of view of metals other than cast iron. He is, however, still experimenting, and I do not know when his experiments will be completed, but I do know that the water-cooled internal combustion engine is a success on cars, and feel sure that it can be easily made so on motor cycles. Some progress in the matter of air-cooling has been made by increasing the efficiency of the radiating fins cast with the cylinders by attaching to them auxiliary fins of aluminium or copper, also by winding copper wire between the fins, thus dispersing the heat much more rapidly by bringing them in contact with metals of high heat conductivity, and consequently cooling the cylinders. Other inventors have sought to overcome the difficulty by placing the exhaust valve in the position in which it will get the maximum amount of cooling, by improving the scavenging of their engines, and by other methods. Readers may say that water-cooling is a needless complication. This is an ancient argument, strongly backed up by the unenterprising manufacturer who does not want to alter his existing patterns. The additional weight involved would be negligible. I

Water-cooling of Motor Cycle Engines.—

feel quite confident that a clever designer could make a small high efficiency water-cooled engine, which would be little, if at all, heavier than an air-cooled outfit, which would be more reliable, need less attention, and keep up its power longer than anything yet made. To render it successful it needs to be well made, and I venture to say that design and careless workmanship have largely been responsible for the limited popularity of water-cooled motor cycle engines.

A Water-cooled Four-cylinder Bicycle.

Our Italian friends whose motor car factories are at the foot of the Alps seem to understand more about the subject than we do in this country. Let our designers study their small cars and consider their neatness of design, their highly efficient radiators, their neat engines, and their magnificent workmanship. The radiators are all cooling surface, and there is no water stored in them which is not presented to the air to be cooled. Shall we ever see a four-cylinder *monobloc* water-cooled small high efficiency motor cycle engine which will be neater, cleaner in design, more reliable, and generally better than anything yet turned out? It has been our dream for years, and I feel sure that one day it will be realised. The subject is a most interesting one, and cannot be dealt with in a short article. I can but conclude by saying that the matter requires more careful consideration than it has received in the past, and it is well to remember that with a water-cooled engine a whole year might elapse without the cylinders being removed, valves would need attention only once in this period, and power would always be maintained. Overheating would not exist, and water leaks could be overcome by good workmanship, so that the very possibility of them could be forgotten. "AILETTE."

MOTOR VOLUNTEERS AND THE WOUNDED IN LONDON HOSPITALS.

On the 3rd inst. an entertainment for a thousand of Britain's wounded heroes was arranged at the Holborn Empire by the London Regiment of the National Motor Volunteers, who undertook the conveyance of the men. The ubiquitous sidecar was, of course, largely in evidence. The machines in the foreground are a 6 h.p. A.J.S. and a 7 h.p. Indian.

TEN YEARS AGO.

Extracts from "The Motor Cycle," March 13th, 1907.

REALISING the close alliance of the manufacture of aeroplanes and motor cycles—inasmuch as the same problems have to be overcome in the way of perfecting the air-cooled engine—*The Motor Cycle* devoted space ten years ago to the description of the Vina aeroplane, which can best be described as a cycle car (it had four wheels) with extensive wings.

In the issue of March 13th, 1907, a photograph appeared of this machine, which was actually the second to fly in France under its own power. It created great enthusiasm in the country of our ally by first covering a distance of fifteen feet at an elevation of three feet, afterwards travelling thirty-two feet at a height of six feet.

In the same issue there is a short article entitled "Motor Cyclists in Warfare." The writer of the article ventilated a discussion then in vogue as to whether military motor cyclists in case of war should be used as despatch carriers and scouts or as combatants with rifles *in the firing line.*

A SIMPLE STARTING TIP.

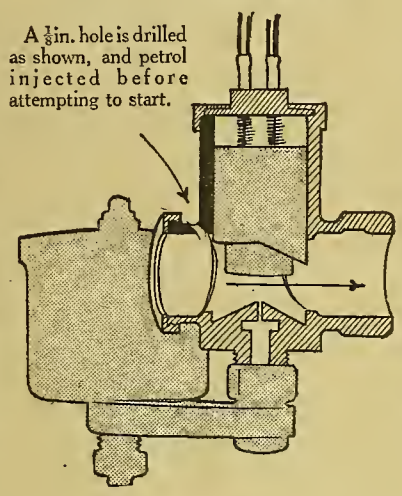
WE have received from Mr. Osborn de Lissa an extremely interesting tip for facilitating starting up the engine. He says he has tested it for about a year, and finds it never fails on the M.A.G. engine, and there is apparently no reason why it should not be successfully applied to other types.

A 1/16in. hole is drilled in front of the carburetter where the air inlet meets the mixing chamber—the carburetter need not be dismantled whilst this is done, but care must be taken that the throttle and air slides are lifted to the top of their travel to prevent the drill from damaging them. All that is necessary is a squirt of petrol whilst the throttle and air slides are nearly shut or in the usual position for starting; this drenches the two slides, and no air can get into the cylinder otherwise than saturated with petrol. The system is better than flooding, and Mr. de Lissa finds this undoubtedly the best position to inject petrol in the inlet system.

He has also arranged a small tap under the tank, with a pipe fitting into this 1/16in. hole, which, of course, is a device only to be used when the tank contains pure petrol.

When it was realised that there would be a shortage of petrol, and that paraffin would be perhaps the only "spirit" available, experiments were made with paraffin. It was found that by squirting petrol into this small hole for perhaps a minute, or whenever the engine showed signs of stopping, the engine could be warmed up sufficiently to run on whatever fuel might be in the tank. This is obviously less trouble than emptying the float chamber, and it is likely to be more effective than priming the cylinders, as the priming can be renewed as required without stopping the engine.

A VERY SIMPLE METHOD OF ENSURING AN EASY START.



PREVENTING WASTE OF PETROL.

A Scheme put forward by "The Motor Cycle" adopted after an Interval of Seven Months.

From *The Motor Cycle* of August 3rd, 1916:

"There are many other sources of waste (of petrol) into which we need not go, such as the ceaseless parade of empty lorries on our main roads, which often pass other empty lorries going in the opposite direction. It would not require much organisation for one lorry to do the transport work of two in cases of this kind."

This suggestion was taken up by our parent journal, *The Autocar*, and brought to the notice of the Ministry of Munitions.

LOCAL PAPER REPORT.

At a meeting of the Coventry Chamber of Commerce on March 6th Mr. Victor Dodd said that a matter had arisen within the last month that he believed would be of interest to the council. The Ministry of Munitions, through the Birmingham Chamber, was arranging for motor transport in the district. The chairman of the Railway Committee requested him (the speaker) to attend a committee meeting, and he was appointed the representative for Coventry as the result. (Hear, hear.) The idea was this: The Ministry were experimenting in the Birmingham district, and if the scheme were a success there they were asked to extend it to Bradford, Liverpool, Manchester, and London. Mr. Dodd further explained that there were hundreds of motor lorries running every day from Birmingham to Wolverhampton, and they came back empty. Similarly with regard to Birmingham to Coventry and *vice versa*, and the Ministry said that they were determined that there should be no empty lorries on the road, and that if a lorry came from Coventry to Birmingham it had got to pick up a load to bring back. Mr. Dodd emphasised the point that this scheme dealt with loads on return journeys only, and it was intended to be of service to the trading community. There would be an office established in Birmingham, and they would also want one in Coventry, and it seemed to him (the speaker) that if they could get them to work through the Chamber of Commerce here it would be a very good thing for the Chamber and also for the manufacturers. Thus, a firm having a load for Birmingham, Walsall, or Wolverhampton, could let this be known to someone at the office of the Chamber, so that the next lorry that came over from Birmingham could take the other load back. He suggested that it would be well for the council to agree to a letter being sent to the Birmingham office stating that they welcomed this proposal on the part of the Ministry, and that they would be willing to do everything possible in Coventry to make it a huge success.

Replying to one or two questions, Mr. Dodd explained that everything was to be sent at owner's risk—that was to be distinctly understood—and that it was calculated there would be a saving of about one-third of the cost to the trader making use of this arrangement.

It was decided, on the proposition of the Chairman, seconded by Mr. Anerhaan, that the secretary should forward a letter approving of the proposal, and giving it the hearty support of the council of the Coventry Chamber.

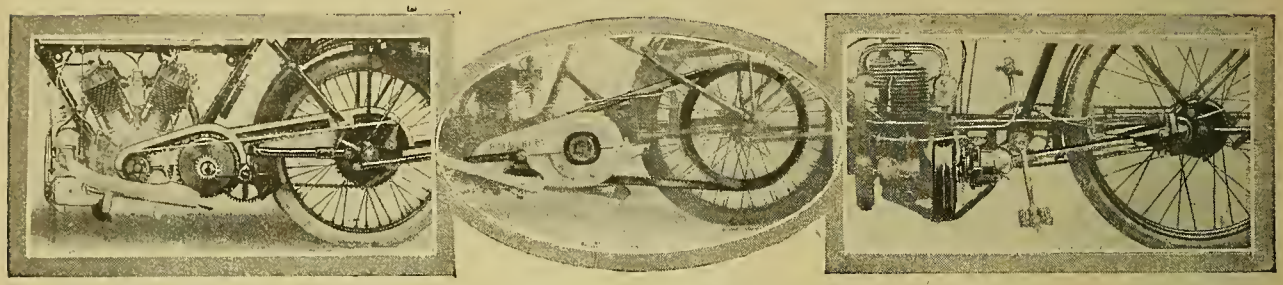
7,800 FEET ABOVE SEA LEVEL.

The photograph, again demonstrating the ubiquity of the motor cycle, was taken on the Muree Hills, near the outer Himalaya Range, India.

SOME TRANSMISSION EXPERIENCES.

A Return to an Old Subject after Many Miles on the Road.

By "ROAD RIDER."



TYPES OF TRANSMISSION.

Bradbury all-chain drive. Royal Ruby chain-cum-belt. F.N. shaft drive.

AFTER a decade of belt drive, the transmission question is certainly in a state of flux. Though the shaft drive remains stagnant, designers divide their suffrages between the direct belt drive, the chain-cum-belt, the two-chain drive, and the three-chain drive (the latter taking the form of two chains from the engine to the countershaft, and a third chain from the countershaft to the rear spindle). Simple-hearted enthusiasts are accustomed to speak and write as if one of the four latter transmissions was bound to emerge into a position of supremacy such as the belt has enjoyed for many a long year. They fail to realise that the transmission question is vitally influenced by two other departments of design. Special types of engine are not equally suited by every form of transmission, so that the drive will be determined to some extent by the kind of *engine* which wins the greatest popularity. An even greater part is played by the evolution of *variable gears*. So long as the single-gear or the hub pattern of change-speed gear ruled the market, the direct belt drive enjoyed obvious advantages; but now that the countershaft gear box is becoming universal, some form of two-step drive, whether all-chain or chain-cum-belt, is necessarily bound to come out on top. My present purpose is merely to state the conclusions drawn from a varied road experience, as they affect the unsolved controversies of transmission.

The Direct Belt Drive.

During the last five years I have driven thousands of miles on machines equipped with the oldest and simplest drive—the direct V belt; and have used it on all types and sizes of motor cycle, ranging from the 2 h.p. baby two-stroke to the 8 h.p. twin and the 5 h.p. sidecar outfit, with and without hub gears. If my riding had been confined to the undulating Midlands, I should never have dreamt of a more efficient transmission. It is infinitely smoother than its nearest competitor, and even on the small 3in. engine pulley of the baby two-stroke it may often stand up for 2,000 miles without breakage or slipping. Its weaknesses are apparent when its user penetrates into really heavy country, and doubly so when a sidecar is attached or freak gradients are tackled. The limit of its achievement is reached when a 500 c.c. solo mount, with a 4½in. engine pulley, drilled with holes, is taken on a Six Day Trial route. More than this, it cannot do. If the engine pulley be reduced to 4in., or the belt size reduced to ¾in., troubles will be frequent and free; if a sidecar be added, slip will be frightfully pronounced. Even if countershaft gears had not threatened the survival of the direct belt drive, the above limit of efficiency is too low. A transmission which either fails altogether or causes considerable anxiety under such conditions can never remain supreme.

Two-step Drives.

Since the countershaft gear box came into vogue, there has been no perfect transmission for a 3½ h.p. single, and the gap represents the most crying need of motor cycle design, since the 3½ h.p. single is still the most popular mount. I am bound to admit that the countershaft Zenith appeals to me as coming nearest the solution of the problem. Its countershaft is set forward of the engine, and the intermediate reduction permits the front belt pulley to be of such enormous dimensions that appreciable slip is next to impossible. Simultaneously, the forward position of this pulley necessitates a very long belt, which can therefore be run rather slack; as a consequence, there is normally an inappreciable degree of slip in the belt, which suffices to ease off all symptoms of snatch, whilst it never becomes sufficient to spoil the drive. It is just possible that the 3½ h.p. singles of the future will carry their gear boxes strapped to the tummy of the engine, so to speak, instead of bolted on behind; and that the increased length of the belt item will serve to eliminate the snatch which at present disfigures the big chain-cum-belt singles. This drive stands up well even when the roads are awash, the gradients are severe, or the fair passenger in the sidecar is of the type of whom there is plenty to love.

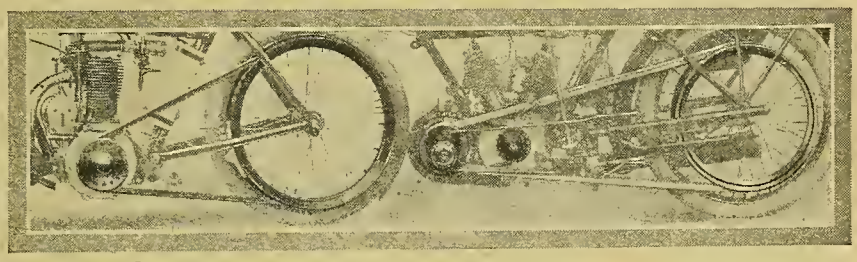
Per contra, the two-step drives lose their snatchiness when they are employed with certain types of engine, which bid fair to oust the 500 c.c. single. The snatchiness is not colossal in character; and the substitution of the milder and more frequent impulses derived from a small single-cylinder two-stroke, a four-stroke flat twin of any size, or a good V four-stroke twin, render a chain-cum-belt or a two chain drive quite satisfactorily smooth. There

Some Transmission Experiences.—

may be moments, even with these power units, when the two-step drive feels snatchy, as, for example, when a baby two-stroke is four-stroking, or when a big twin is thumping slowly on a rich mixture before it picks up; but these faults do not lie primarily at the door of the transmission. In some cases they are exaggerated by a certain sloppiness of fit in the dog clutches of the gear box, which are made loose to facilitate gear changing.

Allowing for the prevalence and superiority of countershaft gear boxes and of engines possessing a more even torque than the four-stroke single supplies, one may safely say that the two-step drive, in one form or another, has come to stay. It remains to be seen whether the belt will be an integral item of the successful two-step or not.

There is one type of chain drive which I cannot conceive will represent the transmission of the future, namely, the three-chain pattern. It is not possible to arrange these twin chains so that they wear evenly; when either chain requires adjustment, the setting must be made with an eye to the second chain; one adjustment will not suit them both, since they have stretched unevenly; the resetting of either chain affects the other; one has to fiddle around with links and half-links; and one is lucky if any ingenuity enables both chains to be accurately tensioned when the job is over. Still, in practice it works well and survives on a few machines because the design obtains a foolproof gear change, seeing that it is based on the provision of a separate friction clutch for each gear. My final decision rests, therefore, between the two-chain and the chain-cum-belt drive.



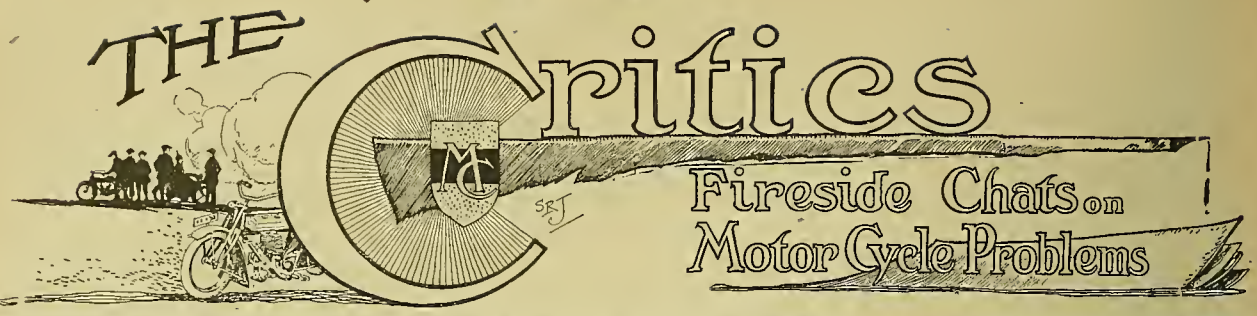
(1) The direct belt drive of the Rudge T T. model. (2) Zenith belt and chain transmission. The forward position of the countershaft and large pulley are conducive to long belt life.

The Two-chain Drive.

The chain drive is upheld by its technical and theoretic merits, which have never yet been fully borne out in practice. An encased chain, running in oil, should give a transmission efficiency of nearly 100%; and its efficiency should last for prolonged periods. Beneath this claim lurk the real and practical demerits of most existing chain drives. It is an acute engineering problem to protect motor cycle chains adequately. It is the simplest thing in the world to construct a machine with encased chains; it is most difficult to make such a machine so that it may satisfy an amateur user. The difficulty applies principally to the casing of the rear chain, for the split aluminium cases employed for the front chain of a modern machine are usually light, silent, and readily detachable. The reality of the problem, as it applies to rear chains, is evinced by the unpopularity of chain cases on push bicycles, seldom as such cases undergo removal; and it is not surprising that the number of motor cycle rear chain cases worthy of the term "satisfactory" can be counted on the fingers. Progress is, however, visible. A faddist may still find justifications for running a first-class machine minus its back chain case, but a methodical user will not find it more of a nuisance than otherwise if he retains it. Great care is needed in making a selection. Some pre-war cases were hideously ugly, prone to rattle, affixed with many small bolts and nuts which habitually vibrated loose, and very clumsily designed, especially in the neighbourhood of the rear spindle end. Progress is further obstructed by the fact that chains are less durable in practice than in theory; for example, a friend of mine has barely completed his first 1,000 miles on a brand new chain-driven twin, costing over £100; yet he has already broken both chains on the road, and in each case the stoppage lasted well over sixty minutes through defects in the accessibility of the cases, complicated by the presence of clutch and gear control details outside the cases near the end of the countershaft. The fact that the user was an amateur, and none too experienced at that, does not help matters, for most drivers come in the same category. Clumsy driving and unfamiliarity with fitters' work intensify the problem; they shorten the life of chains, and they complicate the question of repairs and adjustments. The average user may quite probably break a new chain and irretrievably damage new chain cases. On the other hand, the naked chain requires very frequent attentions, and is the filthiest object in creation to handle.

Chain-cum-Belt Transmission.

It is evident that the chain-cum-belt drive must suffer from very glaring defects if it does not deserve a verdict under the comparison. Probably it suffers from no such defects in principle. It may hardly be equal to the strain of an 8 h.p. engine with a sidecar attached, as the belt fastener is usually weaker than any detail of an all-chain transmission, and for this reason the chain drive must have the vote for cumbrous passenger attachments, despite its serious shortcomings. But for two-strokes of all types, and for multi-cylinder four-strokes there is at present no drive to compare with the chain-cum-belt. The single front chain can be perfectly protected inside a simple two-piece aluminium casting, light, substantial, and rattleless. The gear and clutch control details can be located on the top of the gear box, or at its far side, leaving the chain case smooth and simple. A single countershaft adjuster suffices, and as the belt can be run fairly slack, there is no need to tighten it when the gear box is revolved or slid backwards, after the chain begins to sag a little. There is no need of a cushioning device in the rear hub, and the rear wheel may be left as swiftly detachable, as it is on a track-racing machine.



WHEN the Novice made a dictatorial statement it was usually jumped on by his three companions, at which he would appear in the ignominious light of the city mayor who, intending to kick off, misses the ball and sits down in the mud. Sometimes, however, the Novice "found touch" in proper mayoral style, whereupon he generally made an ugly dash for the security of the grandstand, in mortal terror of being accidentally involved in the scrum.

To-night he hit the mark.

"Many a driver of a 40 h.p. car," he announced, "would fight shy of driving an ordinary motor cycle because of the numerous spiky levers that cover it. Personally, I think the control might profitably be simplified. The other day I rode a machine having a one-lever carburetter, and it was delightful to handle compared with my two-lever affair."

"What the Novice wants," advocated the D.R., "is the old Quadrant arrangement, whereby one lever controlled the spark, the throttle, the exhaust valve, and finally switched off. This system was one of the talking points of the old Quadrant, and when the makers boosted its safety they evidently forgot that the loss of a single pin put the whole shoot out of action—as sometimes happened. No; give me separate controls. The more the merrier, within reason."

"All right for mechanical blighters like you," growled the Novice. "You like twiddling levers, but the average rider doesn't. Give me the one-lever carburetter for simplicity. With my own bicycle the adjustment of the carburetter controls and the spark lever requires constant thought, which detracts from the pleasure of riding. How many control levers would you think there are on a certain military sidecar I examined last week?" "Eight." "Six." "Seven." "Four" were the quick guesses. "Ten," thundered the Novice, and proceeded to outline them: "Two carburetter levers, spark, valve lifter, rim brake, handle-bar clutch—six on the handle-bar alone. Then, foot brake, clutch pedal, change-speed lever, and oil pump. My brother, who drives a car, was positively frightened at the maze of levers on his military sidecar."

It was noticeable that the Manufacturer was holding himself aloof.

"I must say," put in the Journalist, "that *I* twiddle my two levers of the carburetter without conscious thought, and am quite content; but I must acknowledge you are right in asserting that the control generally *is too complicated.*"

"Yes—*you!*" agreed the Novice. "You have been schooled to two levers—known nothing else. But picture yourself in the position of a beginner, whose only way of knowing the correct mixture is from what he is told. The sound of his engine conveys little to him, and he is constantly wondering whether his mixture or his spark is right. Probably he moves the wrong lever, with the result that his engine overheats, knocks on hills, and so on. That, at any rate, is my position."

Ever Varying Conditions.

The D.R. pointed out that bath chairs and auto-wheels made useful combinations, but the Journalist shut him up by observing that everyone had to begin, and that he thought simple control needed every encouragement within engineering limits "Yet the one-lever carburetter has objections," he added. "There are times when one wants a heavy mixture, and times when one wants a light mixture. The one-lever carburetter can allow for engine speed, but it cannot allow for the varying proportions of load and speed. It cannot even allow for the grade of fuel used, some fuels requiring more air, some less. How are you going to make these allowances except by the use of a second carburetter lever? You must have it, and alongside the throttle control is the best place for it."

But the Novice was busily dusting his waistcoat.

"I remember one carburetter manufacturer," stated the Journalist, "whose one-lever carburetter, according to the bill-boards, gave much better results than any two-lever."

"No *doubt* it did!" interposed the Novice.

"It was claimed that for consumption and power there was no comparison."

"Just my point," the Novice again interrupted, bucking up a bit. "Correct——"

"But," pursued the Journalist, impressively, "I notice that that manufacturer has quietly gone back to the two-lever type."

"Yes, but only to satisfy you speed merchants," chirped the Novice.

The Manufacturer at last sat up. "The modern two-lever carburetter is really governed by one lever only—the throttle," he pointed out. "What could be simpler? You merely shove the air wide open after starting, and forget it. From the manufacturer's point of view, the one-lever carburetter is knocked on the head by the fact that each single carburetter has to be set to its particular engine."

"Then again," he pursued, "who is to control the atmosphere?"

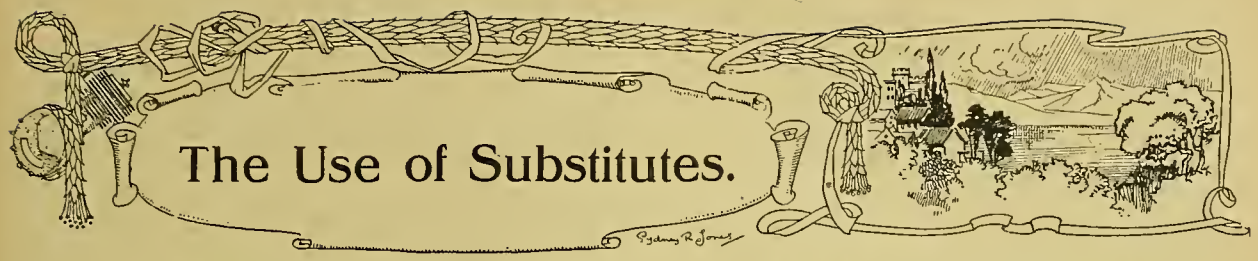
"Who?" repeated the Discharged Soldier, rubbing his rheumatic shoulder. "The machine tuned in winter would be hopelessly wasteful in petrol during the summer," the Manufacturer went on. "Then what about the scores of machines tuned here and sent Overseas—perhaps to the tropics or to immense altitudes? There are enough grumbles from Overseas as it is, but if we started fitting one-lever carburetters we should have Deadwood Dick over from Mexico by the next mail boat to plug lead into us!"

"I would like to see the Novice trying to start an engine some frosty morning if it were fitted with a one-lever carburetter carefully tuned on a sweltering day in August," observed the D.R. "Then there is just one other point, which may be slight, but which applies particularly in the case of a two-stroke. You get too rich a mixture in your cylinder, either by injecting too much, or, as may very well happen, by wheeling the machine along with the decompressor open. You have a most awful job to get rid of the superfluous gas with an automatic carburetter, and that (again in the case of a two-stroke) is one of my objections to the semi-automatic of to-day. With the old system one simply had to close the air, open the throttle, give the engine a turn or two, and away it went with a clean start."

"Then, as regards riding," said the Manufacturer. "A one-lever carburetter would perhaps be all right used in conjunction with a four or five-speed gear box. By skilful use of the gears one can always keep the engine at a more or less constant speed."

"But the one-lever is not wanted by the man who is going to do things skilfully," announced the D.R. "Keeping up the revs. and changing gear at just the right moment requires more mechanical judgment than twiddling the extra carburetter lever. Therefore, the one-lever system is ruled off the boards, except for soda-water syphons, in which case it is excellent."

All things considered, they agreed that the semi-automatic of to-day was the best compromise. It suited the beginner, because, really, he had only one lever to bother about, and since that merely governed speed he could not bungle its use. It suited the old-timer passably well, for, having shaken off his conservatism, he could, by clever adjustment, obtain the same range of results. He did not like it at first, naturally, but the Manufacturer was willing to wager that in a year or two's time not one rider in a hundred would go back to the old separate lever system. "We are out to please all, not merely a select few," was his final assertion. "And, therefore, what better than a compromise?"



The Use of Substitutes.

A Suggestion to Co-ordinate Efforts to provide the Most Efficient Vaporiser.

MANY efforts have been made of late principally by keen amateurs to equip motor cycles suitably for use with heavy fuels. Amateur tinkerers, however, for want of the most scientific means of testing their ideas, and possibly, too, for the want of adequate workshops in which to carry them out, are apt to fall short of the ideal, and to miss those super-refinements which would occur readily to a more experienced and scientific mind.

Mr. F. S. Whitworth's suggestion of co-ordinated effort is an excellent one, and will doubtless be acted upon in more settled times. At present there is obviously an insufficient number of scientific men available with time to carry out the requisite tests.

The following are extracts from Mr. Whitworth's letter which we refer to in a leader:

"Up to the present the testing and the use of substitutes has been left largely to individual and disconnected (though, possibly, often skilled and scientific) experimentalists here and there.

"I do not mean that the use of the substitutes has only occurred here and there, but that the scientific use of them, the proper adaptation of mechanism, etc., have only been made here and there by individual brains and energy devoted to individual machines.

"Why should not a special organisation for the scientific testing of substitutes be initiated by the motor press, urged by the motoring public, and supported by the trade? This organisation to choose a committee of experts, selected from the trade, the press, and from among the best of the enthusiastic and expert amateurs—the business of this committee being to experiment, decide, and recommend one or more forms of vaporisers or other carburetting devices, that should enable owners of existing machines quickly and economically to adapt their machines to the use of paraffin or other substitutes.

Objects of the Committee.

"This committee would take into consideration the existing forms of special vaporisers and the special carburetters as offered to the public, but it should not be in any wise fettered by an adherence to any of those existing types; it should simply be concerned with discovering the best form, or forms, of vaporisers, either in existence, or that can be brought into existence, the selection to be governed by certain agreed tests, such as efficiency, economy, simplicity, etc.

"The backbone of this movement would have to be the motor trade itself; unless the motor trade backed it it would not be thoroughly efficient and successful. By the motor trade I do not mean the vaporiser makers, or even the carburetter makers, but the makers of the motor cycles themselves, and I moreover suggest that the expenses of the researches and testings, etc., be borne by these motor cycle manufacturers as a whole, the amount to be divided among them *pro rata* to the number of machines that they estimate they have upon the road.

"A very small contribution per machine would produce such a sum of money that two or three competent experts (engineers and chemists) could be engaged at ample fees, to act entirely and solely for the committee for the space of a month or so—such experts could readily be selected from the existing staffs of the petrol, carburetter, and motor companies.

Definite Procedure to be Recommended.

"It would be the duty of the committee at the end of, say, a month to recommend a certain definite procedure to every owner of a motor cycle of recognised make.

"The information collected and tabulated in this manner would be most valuable hereafter to both trade and public, for some systematised and proved knowledge of the use of heavy fuels would be available and ready for any future scarcity or undue dearness of pure petrol. Motoring in general may thereby be permanently cheapened, and the use of motors extended.

"F. S. WHITWORTH (Colmore Depot)."

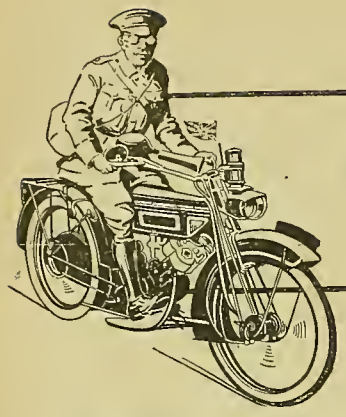
The Secretary of the Petrol Control Committee last week-end issued the following notice with regard to substitutes for petrol used in motor vehicles:

"The restrictions which have been imposed on the use of petrol have led to a considerable increase in the consumption of petrol substitutes. The importation of these substitutes requires the use of tonnage, which it is absolutely necessary to economise. The Petrol Control Committee are therefore compelled to take measures for the limitation of the consumption of petrol substitutes used in motor vehicles, and the attention of all owners and users of motor vehicles is called to the following order which is being issued to all licensed dealers in motor spirit, and will have effect as from March 10th (to-day):

"The sales of all substitutes for petrol which are sold for use in motor vehicles must be entered on the motor spirit licence held by the purchaser.

"The monthly quantity of petrol and substitutes purchased by the owner of any motor vehicle must not exceed the monthly quantity of motor spirit authorised by the Petrol Control Committee to be purchased.

"By order of the Petrol Control Committee,
"H. W. COLE, Secretary."



THE

Disposal of War-worn Motor Cycles.

What is to Become of the Thousands of Military Machines after the War? A Scheme Outlined.

WITHOUT being in possession of exact figures as to the number of motor cycles at present employed in military service, we still know that the number is so very considerable as to make it inevitable that if, after the war, these machines are thrown upon the market in bulk, a serious dislocation of the whole British manufacturing industry must result. Manufacturers, whose goodwill has suffered very seriously through their enforced exclusion from their normal markets, will find the work of regaining those markets immensely complicated by the competition of large numbers of their own second-hand machines. Moreover, a very considerable proportion of these machines will have been used under exceptionally rough conditions, and possibly kept in service by expedients which would not be resorted to under more normal circumstances. Thus the condition and dependability of a big percentage of war-worn motor cycles will be very doubtful. It is certainly against the interests of the manufacturer and also of the public that thousands of British motor cycles, the past history of which is shrouded in mystery, should pass direct into the hands of inexperienced riders and form the basis of their personal judgment as to what motor cycles as a class are worth.

A Suggested Scheme.

A very similar problem arises in respect of the tens of thousands of motor lorries used for transport and supply, and the manufacturers of these, through their section of the Association of British Motor and Allied Manufacturers, have framed a scheme which, though not perfect, appears to possess many merits. Briefly, the proposal is to the effect that every war-worn machine no longer required by the Government when the war is over should pass through the hands of its original manufacturer before being resold. The manufacturer should be required to repair and overhaul it on terms agreed between him and qualified Government inspectors. The work completed, the machine would be marketed in the usual way under the auspices of the manufacturer and accompanied by his guarantee of its condition. Manufacturers could not, of course, take up the whole Government stock at one time. The idea is that they should take it over in batches, and that they should be given a certain limit time in which to dispose of each batch. At the end of that time, if they have failed to get rid of the machines, the remainder would pass back to the Government Department, which would sell them by any means that seemed good to it. This provision would ensure that manufacturers should not deliberately endeavour to restrain the sale of these second-hand machines in the interests of their new stock. The direct competition of the Government would be an even more serious matter if the Government's machines carried with them the makers' guarantee of condition. Consequently, under this scheme the manufacturer would do his level best to get rid of the stuff, so to speak sandwiching in the sales of his new and war-worn machines, and disposing of the latter at a price representing good value for money, but not at an absurdly low figure calculated to paralyse trade of a higher class. In a sense, the manufacturer of a first-class motor bicycle would under this scheme benefit, inasmuch as it would afford him an opportunity of a first introduction to a number of clients who, for the moment, could not possibly afford his list prices.

Labour and Repair Work in Peace Time.

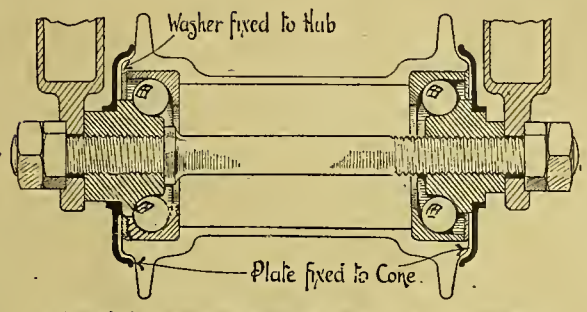
The reputation of the manufacturer would be safeguarded, since it would be mainly his own fault if any machines of his went out again in an unreliable condition. Sometimes, no doubt, incipient fractures, which could not be detected during an overhaul, but which had resulted from previous rough work, would develop. The liability coming under this head would have to be taken into account in estimating the profit to be allowed to the manufacturer.

Of course, it may well be that many manufacturers would object strongly to being compelled to give up a big percentage of their available time and labour at a critical period to repairing work instead of to new construction. It must be remembered, however, that the alternative is a very serious one, unless some other and better scheme can be devised. It is, of course, conceivable that a manufacturers' syndicate might be formed to purchase back the whole of the remaining machines at fair prices, and to do what they like with them. However, the capital required would be considerable, and the fair allocation of responsibility very difficult. The manufacturer certainly cannot expect the Government to adopt a scheme solely in his interests. Any proposal, to be acceptable, must tend to secure for the Government itself better prices than would otherwise be realised, and to act in the interests of the public by protecting it from the vagaries of machines that may have become untrustworthy through no fault of their own.

As already stated, the plan outlined above is not put forward as representing perfection, but rather as a practical basis for discussion and fair consideration, which it is to be hoped will be given not by manufacturers alone, but by motor cyclists, who, as a class, are to be the ultimate owners of what remains of the great fleet of motor cycles that have done, and are doing, such signal service in connection with the war.

FRONT HUB DESIGN.

LAST week we published a letter from Mr. Douglas W. Grover on this matter, in which he suggested a good form of mud excluding hub. Messrs. John Marston, Ltd., of Wolverhampton, call our attention to the special design of front hub fitted to the 3½ h.p. Sunbeam as being almost identical with Mr. Grover's idea. A metal disc with turned over edge is fixed to the cone, and further protection is given by an interior washer fixed to the hub. Whilst this hub, in common with many others, contains one part of our correspondent's suggestion, it misses the principal point, *i.e.*, the larger clearance and distance pieces between the cone and the fork. Nevertheless, the Sunbeam hub is an effective arrangement, and has given complete satisfaction during the past twelve months.



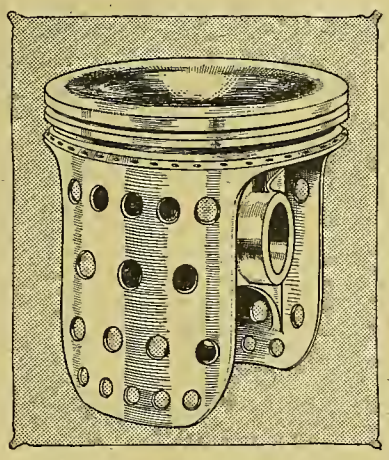
A front hub of effective design as fitted to 3½ h.p. Sunbeam motor cycles.

NOVEL PISTON DESIGN.

A "Slipper" Type Piston designed by Mr. H. R. Ricardo, B.A., A.M.I.C.E.

IT is, of course, well-known to the designers of motor cycle engines that pistons must be as light as is consistent with strength, must cause as little friction as possible in the cylinder, and must be so designed that the heat will be dissipated without undue delay.

A piston designed with these objects in view was described in *The Autocar* of last week and forms the subject of a very interesting article in *The Automobile Engineer* for March. To attain lightness the piston is constructed of aluminium; every useless part of the piston has been removed, and the gudgeon pin is carried by ribs connected with the piston head instead of the ends only being carried by the piston walls. Where the skirt is not really required—that is to say, on the sides of the piston which are not subject to thrust owing to the angularity of the connecting rod—it is entirely removed. What remains of the skirt is drilled with holes of moderate size; this not only still further lightens the piston, but it breaks up the film of oil between the piston and cylinder walls, thereby greatly reducing the friction between the two, which depends largely upon the viscosity of the oil and its resistance to shearing.



A unique design of piston by Mr. H. R. Ricardo, B.A., A.M.I.C.E

With the object of preventing any burnt gas which may pass the piston rings from contaminating the oil on the cylinder walls, small holes are drilled around the bottom of the lower ring to allow of the free passage of this gas into the crank case before reaching the piston skirt.

Briefly, Mr. Ricardo's piston has the following advantages:

(1.) Gas pressure is transmitted directly to the centre of the gudgeon pin bosses.

(2.) Bearing surface is provided only where it is needed.

(3.) There is a passage for burnt gases which pass the piston rings.

(4.) The lower ring acts as a scraper, and returns the oil through the small holes.

Readers who desire more information are referred to the journals mentioned, where power and consumption curves are given.

ECONOMY?

WHAT is a poor man to do? Take my case. For a good many years now I have used a motor cycle summer and winter, wet or fine, snow or frost, to reach my work in the morning and get home at night. I chose this means of conveyance as the most economical and healthy. It costs me as much, perhaps, as a season ticket, but it occupies far less time than travelling by train, and there is no hanging about in a draughty uncomfortable station waiting for a train which should have arrived but has not. Moreover, I arrive at my destination more fit for work after a brisk run through the fresh morning air and pleasant country.

The Government says "Economise!" This in my case is superfluous advice. I always economise because I have to. The papers are full of tips nowadays. For instance: Always boil a potato with a jacket on. This does not mean that the cook must be dressed to go out, nor that the potato must be dressed to go in (to the pot). It means, in fact, that the potato must go into the water like the rest of us, undressed, but with a jacket on—a quaint anomaly! It is not necessarily in the National interest that I should ride to work on the cheapest of all vehicles—no, I can waste an hour every day walking to and from the stations, or must take a taxi and economise!

PUZZLED.

CURRENT CHAT

Time to Light Lamps

GREENWICH TIME.

Mar.	15th	... ...	6.31 p.m.
,,	17th	... ...	6.35 ,,
,,	19th	... ...	6.38 ,,
,,	21st	... ...	6.42 ,,

A Broader Title Needed.

Will the Petrol Control Committee extend its title to embrace substitutes? Why not the Petrol and Substitute Control Committee?

Second-hand Values Declining.

The unwelcome attentions of the Petrol Control Committee to substitutes is bound to have an adverse effect upon the prices of second-hand motor vehicles.

Why not 28in. × 2½in. Tyres?

The suggestion of 28 × 2½in. tyres in the discussion on 26in. *versus* 28in. wheels by "The Critics" last week has set more than one manufacturer thinking.

1½d. or ¾d. a Mile.

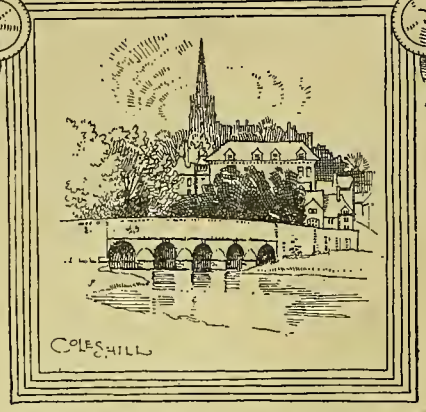
You are asked to economise. A motor cyclist effects economy by riding his machine at ¾d. a mile in preference to using the train at 1½d. a mile, but he is now to be deprived of the opportunity by a Government Department.

A Hard Case.

An officer just returned for home service duty, after having been invalided from France, seeks our assistance with regard to a petrol permit. When he went to France it was not necessary to have a licence. He is now bewailing the fact that it is too late to secure one. The Petrol Control Committee has hitherto treated many cases of this kind with sympathy.

An Injustice.

"Is it a fact," a reader asks, "that car licences go on until the end of April and motor cycle licences carry on only to the end of the present month? If so it is a preposterous decision." We entirely agree with our correspondent, since we are urged to economise in every possible direction, and we have evidence that many motor car drivers have replaced their vehicles with motor cycles in order to travel further on the quantity of petrol allotted to them. It is a distinct injustice to be deprived of a month's petrol allotment. A car, as everyone knows, consumes four, five, and in some cases six times as much petrol as a motor cycle, so that it is difficult to understand why the motor car should have been favoured in this manner. The original idea, of course, was that the work of the Petrol Control Committee would be eased when renewal time came along if motor cycle and motor car licences fell due on different dates, but in view of Government exhortations the arrangement might very well have been reversed. This is not intended as a selfish comment, but simply consistency in the matter of economy.



The American Army and Motor Cycles.

Motor cycles are proving satisfactory in service on the Mexican border, the officers being particularly enthusiastic in their eulogy. Of course, praise of military motor cycles, of their behaviour, of their unquestionable utility, and, one might say, indispensability in Europe, is fully and ungrudgingly bestowed. It is not surprising to have a satisfactory American military opinion of them. We hear that there are already 260 employed in service on the Mexican border.

Daylight Saving Next Month.

There is not much doubt that the majority of motor cyclists will welcome the renewal of the daylight saving scheme again. If the full benefit of gaining so many more hours of summer sunshine is not fully appreciated during the war by all, there is not much doubt that it will be when the "piping times of peace" arrive. The committee appointed by the Home Secretary recommend "that the period of the operation of summer time should be from the second Sunday in April to the third Sunday in September in each year, and that the variation from normal time should be one hour throughout the whole period."

The Royal Overseas Officers' Club.

On the afternoon of the 6th inst., H.R.H. the Duke of Connaught, accompanied by Lt.-Gen. Sir Francis Lloyd (G.O.C. the London District) and Sir Alfred Mond (of the Office of Works), took over the Royal Automobile Club premises in Pall Mall, and formally reopened them as the Royal Overseas Officers' Club. The proceedings opened with a speech by H.R.H., in which he declared the Club to be opened.

Sir Francis Lloyd explained the position of those who would be entitled to use the Club in future. These would be officers of the Dominions and Overseas Forces, commissioned officers already members of the R.A.C., members of Parliament, and members who were certified as workers for the British Red Cross Society and St. John Ambulance Association. Civilians directly engaged on war work would remain members; and as to what constituted war work would be decided personally by Sir Francis Lloyd.

Special Features

VAPORISERS AND THE USE OF SUBSTITUTES.

TRANSMISSION EXPERIENCES.

THE DISPOSAL OF WAR-WORN MOTOR CYCLES.

Average Prices.

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*. Difficulty in obtaining a sufficient number of one model often arises, owing to the fact that many advertisers omit some of the essential details, while others include fitments not supplied with the standard machine.

Make	Year	H.P.	Average for last week.	Latest weekly average obtainable.
Abingdon ..	1914	3½	—	£25
A.B.C.	1914	3½ T.T., 3-sp. s-car	—	£70
A.J.S.	1914	6 3-sp. sidecar ..	£56	—
,, ...	1915	6 3-sp. sidecar ..	—	£85
,, ...	1916	4½ 3-sp. sidecar ..	—	£90
Alldays	1915	2¾ 2-speed	£25	—
Ariel.....	1914	5-6 sidecar	£55	—
,, ...	1916	5 3-sp. sidecar ..	—	£76
Auto-wheel .	1914	.....	£7½	—
Bat.....	1912	T.T.	£32	—
,, ...	1914	4-5 2-speed	—	£39
Bradbury ..	1914	6 sidecar	£48	—
,, ..	1912	3½ 2-sp. sidecar ..	£25	—
Brough	1916	3½ 2-speed	—	£66
,, ...	1915	4 2-speed	—	£49
B.S.A.	1912	3½ 2-speed	£28	—
,, ...	1913	3½ sidecar	£39	—
,, ...	1915	4½ sidecar	—	£58
Calthorpe ..	1915	2-sp., 2 stroke ...	£25	—
,, ..	1915	2¾ J.A.P. 2 sp. ..	£26	—
,, ..	1914	4 sidecar	—	£34
Chater Lea .	1914	4 sidecar	—	£55
Clyno	1915	2¾ 2-stroke	£22	—
,, ...	1914	6 3-sp. sidecar ..	£65	—
Douglas ...	1913	2¾ 2-speed	£28	—
,, ...	1914	2¾ 2-speed	£40	—
,, ...	1915	2¾ 2-speed	£42	—
,, ...	1915	4 2-sp. sidecar ..	£60	—
Enfield.....	1916	6 sidecar	£70	—
,, ...	1916	3 2-speed	£40	—
Excelsior ..	1916	2¼	—	£24
H.-Davidson	1916	7-9 sidecar	£80	—
,,	1915	7-9 sidecar	—	£70
Henderson .	1915	9 2-sp. sidecar ..	—	£85
Humber ...	1913	3½ sidecar	£28	—
,, ...	1914	3½ 3-speed	—	£35
Indian	1916	5-6 3-speed	—	£50
,, ...	1916	7-9 sidecar	£78	—
,, ...	1915	7-9 T.T.	—	£48
James	1916	2-stroke, 2-sp. ...	£30	—
,, ...	1915	4½ 3-sp. sidecar ..	—	£58
Levis	1916	2½ 2-speed	£33	—
,, ...	1915	2½ Popular	—	£22
Matchless ..	1915	7 sidecar	—	£72
,, ..	1913	8 sidecar	£36	—
New Hudson	1915	3½ 3-sp. sidecar ..	—	£42
,,	1914	2¾ 2-stroke	—	£22
P. & M. ...	1914	3½ 2-sp. sidecar ..	—	£57
Precision ..	1915	4½ 3-speed	—	£30
Premier ...	1914	2-sp. sidecar	£42	—
Quadrant ..	1914	4½ 3-speed	—	£28
Radco	1915	2¾ 2-stroke	—	£16
Rex	1914	6 2-sp. sidecar ..	£35	—
Rover	1912	3½ 3-sp. sidecar ..	£29	—
,, ...	1913	3½ 3-sp. sidecar ..	£32	—
Royal Ruby	1914	3½ 2-sp. twin	£33	—
Rudge	1916	5-6 Multi sidecar .	£50	—
,, ...	1916	3½ 3-sp.	—	£55
,, ...	1915	5-6 sidecar	£40	—
Scott	1916	3½ sidecar	—	£68
,, ...	1915	3½ sidecar	£48	—
Sunbeam ..	1916	8 sidecar	—	£100
,, ..	1916	3½ sidecar	—	£86
,, ..	1915	3½	£70	—
Triumph ...	1913	3½ 3-speed	£30	—
,, ...	1914	4 3-sp. sidecar ..	£36	—
,, ...	1915	3-sp. sidecar	£44	—
Zenith	1916	4-5 twin	—	£50
,, ...	1916	8 sidecar	£65	—

The National War Funds.

At the week-end the principal war funds stood as follow :

The Prince of Wales's Fund (distributed £3,465,508)	£6,074,222	0	0
British Red Cross Fund	6,322,644	0	0
Tobacco Fund	126,620	0	0

Spring Frames.

No more conclusive proof should be necessary to show that the spring frame agitation reveals a real and crying need when we state that since our campaign we have had ninety designs submitted to us for review.

Novel Loads.

When potato supplies ran out at retail shops motor cyclists were employing sidecars to obtain supplies from the Cudham and Westerham farmers. A sack cost 9s., and the sidecar solved the transit problem, and relieved many motor cyclist households of anxiety.

Circulation of "The Motor Cycle."

As is fairly generally known, *The Motor Cycle* enjoys the largest circulation of any journal of its kind in the world. In 1916 the circulation was round about the 80,000 mark throughout the year, the January 6th figure being 84,094, June 1st 78,795, and December 28th 80,010.

Engine Efficiency.

Those motor cyclists who are interested in the question of engine efficiency—and who among them is not?—will do well to read the five-page description in the current issue of *The Light Car* of the Bugatti, which has perhaps the most efficient small four-cylinder engine existent. The price of *The Light Car* (issued every Wednesday) is still one penny.

A Great Englishman.

It is not generally known that we owe the discovery of aluminium, alloy steel, benzole, and the magneto to an Englishman—that extraordinary genius Michael Faraday. An interesting fact is that to all intents and purposes the first electro-magnetic machine made on a commercial basis and founded on Faraday's experiments of 1831 is the same as the magneto on the Ford car.

The Discoverer of Benzole.

Faraday discovered benzole in 1824, but, just as it has been with the magneto and tungsten steel, foreigners profited by the discovery. We know only too well how we have been exploited by the Germans in respect of other commodities that were the invention of Britishers.

Is Club Life Dead?

According to a report from Canada the day of motor cycle clubs is over, and it is emphatically declared that clubs will not be supported as they were before the war. We do not think the motor cycle club spirit is dead in Britain, however; it will come back probably stronger than ever. There are thousands of potential private owners of motor cycles serving the country who before the war were probably little interested, but who, being now closely associated with things mechanical, have become enamoured of the handy, reliable motor cycle. Besides that, the habit of fraternising will be hard to kill, and that fact alone speaks well for the future of many clubs now dormant.

The Motor Industry's Terrible Position !

A writer in a paper called *Commonsense* says that only the war saved the motor industry from extinction, and that it was on the verge of bankruptcy in 1914. The writer in question entertains one with his rather ridiculous deductions and inferences. The really humorous part of it is that the article is meant to be taken seriously.

Fuel and Second-hand Values.

It is felt that the new Order relating to petrol substitutes will have an adverse effect upon the values of second-hand machines. Already the cessation of petrol permits was beginning to be felt, and the restrictions placed upon the use of petrol substitutes has still further shaken the inflated prices ruling of late. Throughout the country there is bound to be a considerable amount of motor cycling. Quite apart from private petrol and substitute stocks on hand, motor cycles are used so extensively by the Army and Navy and different Government Departments that they will still remain conspicuous on the road

A Home-made Sidecar.

A Durban (S.A.) reader, Mr. L. R. L. Acutt, sends us the photograph reproduced on this page of a sidecar designed and built by himself. The body is octagonal, and constructed of 26 gauge iron on a framework of ash, and weighs about 45 lb. The upholstery is in dark maroon, the body being enamelled in Harley grey. Fitted to the sidecar is an electric lamp run from a dynamo attached to the front forks. The smart-looking riding costume worn by the fair sidecarist is her own design and make, and executed in navy blue with saxe collar and cuffs. The designers of both the sidecar and riding suit are to be congratulated on their efforts.

Caveat Emptor.

One of our readers, a motor cyclist, if you please, of four years' experience, purchased a motor cycle without trial from a man who told him it would "go anywhere." The other day he wrote to us complaining that the machine would only travel on the level and downhill, and asked us for advice. Advice in such circumstances is impossible for us to give, however willing we may be. We are constantly reminding our readers that on no account should machines be purchased unless a trial run is given, or unless the purchaser, being a novice, brings an expert with him to examine the machine. It is only by such methods as this that a satisfactory purchase can be made. There is valuable advice on the question of buying a second-hand machine in "Motor Cycles and How to Manage Them."

Features of the Present Issue.

In this week's issue there is an abundance of articles of special interest. Among them is one in which the pros and cons of water-cooling are fully discussed and weighed in the balances. The faults and virtues of chain, belt, chain-cum-belt, and every type of motor cycle transmission are dealt with in another very informative article. The Critics continue to disagree—this week on "Controls."

A new feature, which will be acceptable to those who are fond of experimenting and are handy with tools, is a page of "Ideas," mainly contributed by readers, and who have found these "gadgets" of practical use. Further contributions for this page are invited, and will be paid for if published. The "Work of Volunteer Motor Cyclists," "Ladies and the Motor Cycle," and "The Disposal of War-worn Machines" are among other interesting articles.

An octagonal metal sidecar designed and constructed by a Durban (S.A.) reader, fitted to a Harley-Davidson Observe position of speedometer (See paragraph.)

WAR-BATTERED MOTOR CYCLES.

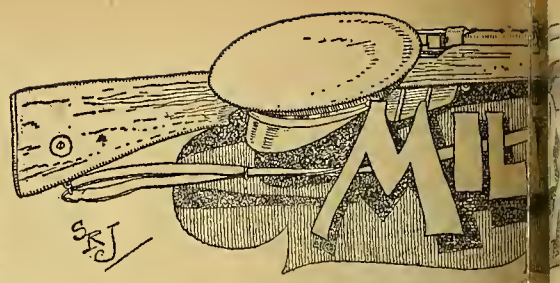
WHAT is to become of the fifty thousand-odd motor cycles (this is merely a rough estimate by *The Motor Cycle*) at present in the service of the British Army? This is a question frequently asked. A scheme for the disposal of these war-worn motor cycles is outlined in an article appearing in this issue. We direct the attention of readers and manufacturers in particular to the suggestion.

AN AIRMAN IN TWO MONTHS

R. LESLIE KENT, R.N.A.S., son of Mr. S. Jordan Kent, of the firm of Messrs. Bransom, Kent, and Co., Ltd., the well-known accessory dealers, of 40, Great Eastern Street,

London, E.C., is the subject of the accompanying illustration. Mr. Leslie Kent was assisted to join the R.N.A.S. through the agency of *The Motor Cycle*. He only commenced duties in December, is now in France, and has been doing some solo flying, and so has made rapid progress.

ARMOURED CARS IN THE EUPHRATES.



IN addition to the thousands of motor cyclist despatch riders and sidecar machine gunners recruited and examined by *The Motor Cycle* during 1914, 1915, and 1916, old readers will recall frequent appeals in these columns for car drivers. The men who responded are now mostly driving armoured cars, chiefly Rolls-Royce, Leyland, and Ford, and are scattered all over the world. The Light Armoured Motor Batteries were formed before the days of the Tanks, and three weeks ago we published an account of a battery of them in the operations chasing the Senussi in Egypt. A driver attached to another battery serving with the Mesopotamia Expeditionary Force sends the Editor the following interesting letter dated January 31st:

"This is the first time you have heard of me since you passed me for the Motor Machine Gun Service in July, 1915.

"At present we are operating with the Indian cavalry in the Arabian desert, looking for Shiek Jamie, who seems to be causing most of the trouble on this part of the Euphrates. He makes numerous raids on convoys, railways, and telegraphs, etc., and generally succeeds in getting away, unfortunately. All our cars are the ordinary Rolls-Royce, armoured, of course. Most of the desert is fine for cars, and we have done 50 m.p.h. several times. The only thing is the deep nullahs and ditches; of course, if we hit one of these at speed it is 'all up.' We generally have a Douglas to pilot each car, and it picks out the best tracks; and the way this little bicycle stands up is marvellous. One or two improvements are wanted, however. For instance, the back stand wants a spring device similar to the Rudge, the front stand is hardly high enough, the clip is not strong enough, and the mudguards have insufficient clearance, so we do without them altogether. Last, but not least, [illegible] controlled clutch is an absolute [illegible] Ford cars carry our ammuni[illegible] transport, so we have England's [illegible] America's best (?), but they [illegible] work well. I am writing this l[illegible] the ruins of Mr. Abraham's b[illegible] The rainy season is just comme[illegible] expect we shall 'close down' [illegible] weeks or so. We get a good bit [illegible] patrol work in the desert. W[illegible] like to see more news of our [illegible] the Clyno sidecars in France. [illegible] luck. I hope we shall soon b[illegible] Blighty with its hill-climbs, etc.

"(Dvr.) Jack W. Sum[illegible]

SINGLE V. TWIN IN GRA[illegible]

THE accompanying photogra[illegible] the members of an A.S. [illegible] shop staff stationed on [illegible] Coast, of which Sgt. W. A. [illegible] (in the group) is head tester. [illegible] our readers will recall the fact [illegible] Davenport joined the No. 5 P[illegible] the Motor Machine Gun Se[illegible] motor cyclists of which were g[illegible] by the Editor of *The Motor* [illegible] after the outbreak of war. [illegible] says: "We are solely on m[illegible] work; the machines we are g[illegible] be gentle) are varied both in [illegible] condition. This last stretch [illegible] weather made me long very [illegible] the even torque of the Lea-Fr[illegible] ride big singles is, to say [illegible] exciting, and I felt that som[illegible] correspondents who swear by [illegible] could receive enlightenment if [illegible] first a single and then a sma[illegible] these roads under the recent c[illegible]

A.S.C. workshop staff engaged solely upon motor cycle work. Sergt. W. A. Davenport (second from the left) is the head tester.

"ROAD" CONDITION[illegible] MESOPOTAMIA.

"I SHOULD very much like [illegible] Cpl. A. J. Sproston's let[illegible] difficulties of despatch [illegible] Mesopotamia—that is if it is

On the way to Shaika Fort[illegible] footprints in the soft g[illegible]

Notes

," writes Cpl. R. W. George, M.T., S.C., from Mesopotamia.

'The film enclosed will help to explain e nature of this country's 'roads.' It is taken on our way to Shaika Fort. I ink it will explain a difficulty which has le overcome by the M.T.'s and D.R.'s t in Iraq. You will note our lorries e 'Peerless,' which have been wonders rough the heat, mud, and dust. We ve now been out here twelve months, uich surely is a good test. Left the ılf in July, back again in October.

"The previous photograph you repro-ced of my Triumph in the mud was ten on the same track."

A FLIGHT INSTRUCTOR.

AST week during the cold snap we observed a figure on a motor cycle attired as for the Polar regions, .ting through the snow flakes. It wed! Hesitating, the rider returned. hen he had removed goggles, helmet, d muffler, we espied under the racing t and leather coat Ivan B. Hart-Davies, w Sec.-Lt. in the Royal Flying Corps. e was bound for Castle Bromwich on s Triumph. Hart-Davies is at present gaged instructing airmen in England.

MOTOR EXPEDITION ACROSS A DESERT.

JNDER the heading "Chasing the Senussi" we referred on February 22nd (page 152) to the successful pedition against Sayed Ahmed, the and Shiek of the Senussi at Siwa. ving to the difficulties of supply, a urney of nearly 400 miles out and me had to be performed in a week. ıe column consisted of 146 motors of rious classes, Rolls-Royce armoured rs, Talbot waggons, Ford light patrol d supply cars, a Daimler lorry carry-g an old Krupp gun which had been ptured from the enemy, and, lastly, motor cycles, which, to the surprise of everyone but their riders, managed to get through the difficult journey.

It was reported that the Segga Pass was mined, but an officer found a possible way for the cars which would have turned an ordinary motorist giddy. However, the capacity of the drivers was such that every vehicle negotiated the difficult pass in safety.

At first the cars had a hot reception from the Senussi. One was left in the centre to engage the enemy, and had a very hot time for half an hour, while the others moved right and left to enfilade the position. The enemy attempted a charge, but were repelled by the machine guns, and at about 5 a.m. commenced their retirement. When dawn broke their figures could he seen against the sky trekking westward over the precipitous hills, where they could not be pursued. Our men destroyed the camp and collected a quantity of arms and ammunition which the Senussi could ill-afford to lose. At 9 a.m. the British entered Siwa, and were joyfully received by the inhabitants, who had suffered much from the Senussi.

R.F.C. RECRUITS.

RECRUITS for the R.F.C. must be over nineteen years of age. This fact has caused a good deal of trouble and misunderstanding among young men between the ages of eighteen and nineteen who are skilled mechanics or motorists, and are anxious to join this corps. The reason for this age limit is that the R.F.C. is essentially an Overseas force, and, according to the present regulations, men are not allowed to be sent abroad until they are fully nineteen years of age. Exception will be taken in the case of young men of eighteen of proved ability in various mechanical trades and professions, provided they sign on for four years, of which the first one will be served at home. This will mean that when the war is over, if it is before that period, these men will not be demobilised, but will have to continue in the corps until their time has expired.

MOTOR CYCLISTS AND R.F.C.

AMONG older married motor cyclists who have joined the R.F.C. is Second-A.M. F. Heather, of Bromley, whose motor cycle depot, nearly opposite the Dermatine Belt Co.'s premises, is well known to South Coast tourists.

A veteran of the cycle and motor cycle pioneer days, Heather was for some years in business in Redhill, in the Brighton Road "boom" days.

F. Heather, 2nd class mechanic attached to the R.F.C. Previous to joining up Heather was the Enfield agent for Bromley, Kent.

COMMISSIONS FOR MOTORISTS OVER MILITARY AGE.

READERS over military age who have (1) a sound knowledge of motoring, (2) are good drivers of cars, and (3), preferably, capable of riding a motor cycle, may now obtain commissions in the A.S.C., Mechanical Transport. Those possessing the necessary qualifications should communicate at once with Mr. J. W. Orde, secretary, the Royal Automobile Club, Pall Mall, London, S.W.

W. George, M.T., A.S.C. Observe the a difficult test for motor vehicles.

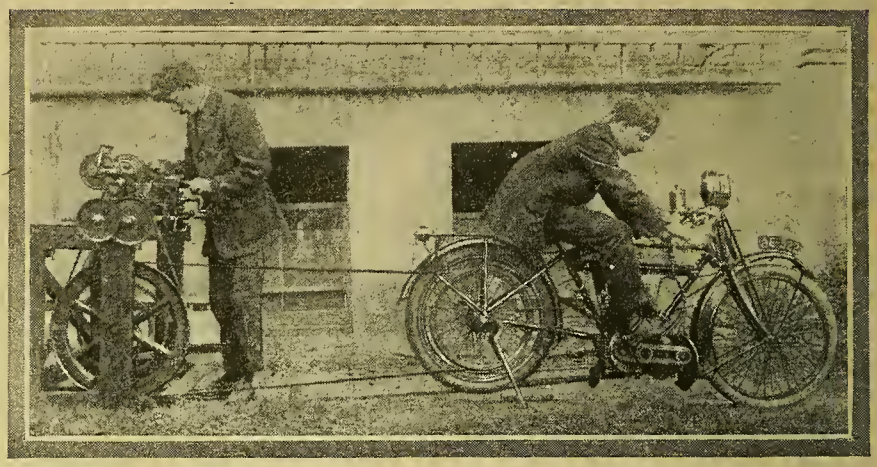
DESPATCH RIDERS OF THE 2ND CANADIAN DIVISION SIGNAL COMPY., B.E.F.

(Top row, left to right) Cpls. Knowles, Hall, Mason, Austin, Burgess.
(Lower row) Cpls. Broomhall, Mackay, Sgt. Frow, Cpls. McEwen and Roper.
Cpl. Smith with Teddy the mascot.
All these men have a long period of active service to their credit.

The Utility of the Motor Cycle.

IN these days, lucky is the man who owns or has access to a lathe. Garage repairs, as riders have found to their cost, are in some cases scamped, and are frequently delayed through lack of labour, though the owner is not always to blame in this respect. When ordinary repairs and overhauls can be done at home, such as valve grinding, and the making of minor renewals, a great saving of time, money, and temper is effected.

The ordinary treadle lathe usually has a pulley wheel, and can be easily worked by power other than a muscular leg, and the illustration on this page shows how a 3½ h.p. Ivy Precision was used as the motive power. To run such a lathe the brake rim is used as the pulley for transmitting the power by belt. On starting up, the lathe is set in motion by the pedals, and soon the belt takes up the drive; needless to say the throttle requires careful adjustment to prevent undue overheating. To overcome this difficulty a cooling arrangement was devised, and a fan was fastened by means of a chuck to the pulley. As the lathe was used indoors the exhaust fumes were carried away by means of a long pipe from the exhaust to the chimney. The machine being fitted with a three-speed hub enables heavy work to be done, and the owner is very enthusiastic about the contrivance, and says the lathe works well and saves a great amount of labour.



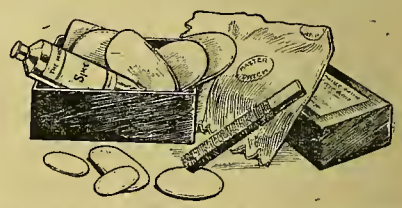
A 3½ h.p. Ivy-Precision motor cycle used as the motive power for driving a lathe. The experiment was quite a success, to which the three-speed gear contributed in no small measure.

A fan, secured to the pulley by the use of a chuck, is used as a means of cooling the cylinder

THE MASTER REPAIR OUTFIT.

WE have lately been trying a repair outfit known as the Master, introduced by Messrs. Gerrard and Co., 89, Great Portland Street, London, W., which consists of a tube of special solution, a rag, and a stick covered with emery, used for the purpose of cleaning the tube. The patches are red in colour and are backed with canvas.

To repair a tube, the surface round the puncture is first of all cleaned by means of the emery stick, and then a coating of the special solution is applied to the tube and to the rubber surface of the patch. Both are allowed to remain until



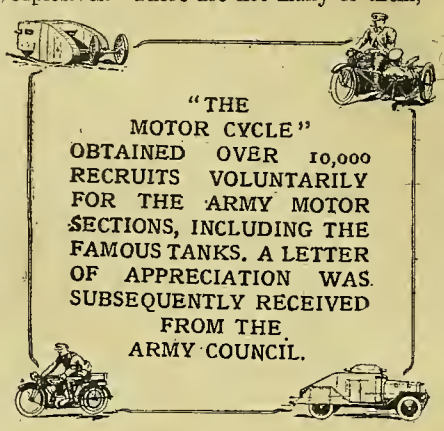
they are apparently quite dry, when the patch may be applied. The repair which we effected by means of this outfit was quite successful. Each box is supplied with a piece of soft cloth, which may be used for cleaning the tube with petrol.

The Ban on Petrol Substitutes.

THE fact that petrol substitutes have to be entered on petrol licences has not come altogether as an unexpected blow. We are told that the reason for controlling the sale of these substitutes is because they occupy valuable space in ships. This, in a sense, is true, but there are already large stocks held by various dealers in the country which cannot now be got rid of. Surely it would have been more just to allow these stocks to be used up gradually than suddenly to impose a restriction which further hampers an already much-hampered industry.

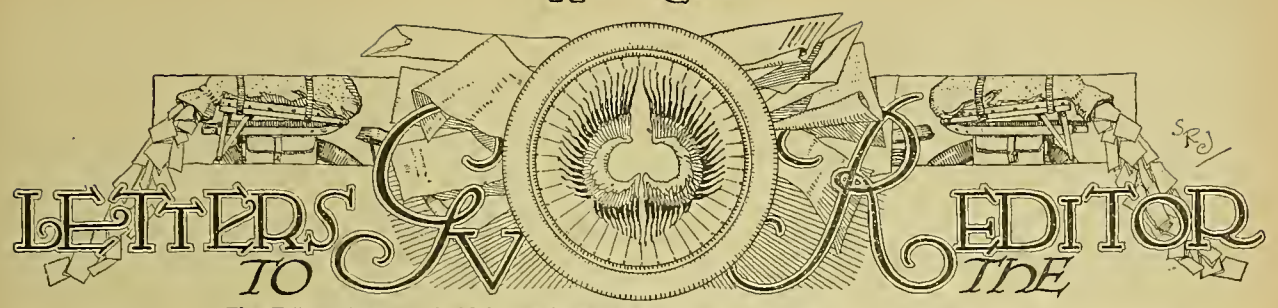
We quite agree with the Petrol Committee in their efforts to save tonnage for the importation of food-stuffs, but we do think that they might have exercised a little more discretion so far as petrol substitutes are concerned.

The committee have also made no attempt to differentiate further between foreign-made substitutes and those produced at home. While at the present time the majority of petrol substitutes are white oils, obtained from the same source as petrol and paraffin, there are others of the same nature as benzole, which are allowed to be sold because they are of no use in the manufacture of explosives. There are not many of them, but, still, there are some, and it seems unjust that they should be placed under the same ban as the others. It might lead one almost to suppose that the restrictions have been made more for the reason of injuring the motorist than of effecting a desirable economy.


"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

REFUNDING OF TAX.

THERE is quite a sporting touch about the Chancellor of the Exchequer's offer to refund half the tax payable on a motor cycle if the licence for the machine is surrendered before June 30th. Since it has been openly stated by Government officials that every effort is being made, and that there are reasonable grounds for supposing that the war will end by the autumn, a good many will hesitate as to what to do. We imagine that a great many motorists will be content to leave the whole of the amount with the Government on the chance that motoring—dare we say it?—will be once more possible before the end of the year.



The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address

KONKING.

Sir,—Recently I went a twenty-mile journey, accompanied by a surplus amount of the konking nuisance. It was not carbon deposit, nor overheating, and my carburetter levers (Binks) were in the usual positions; yet I felt sure that the cause must be too much air. Finally, I examined the jets, and found them almost choked up. The carburetter was automatically giving too much air for the amount of heavy fuel passing up the jets. I have never before been impressed with the idea that "konking" may be caused by choked jets, and I have been using a Binks three-jet instrument for eighteen months. R. G. HOWARD.

ENTERPRISE.

Sir,—War time experiences, because of the element of uncertainty, are usually interesting. Here is a little shopping incident. I called at the Bancroftian stores the other day and asked for a nickel compression tap to match the other in my twin engine, but the only one in the stores was brass. Nothing daunted, the bright lady assistant came to the rescue with a bottle of chalk-like liquid, which she deftly rubbed over the tap, and in one shake of a duck's tail had transformed my brass tap into a silvered one, no extra charge being made for the silvering process. Who says there is no enterprise in this country? The usual disclaimer. VICTOR ROBB.

CARBURETTER ADJUSTMENT.

Sir,—Last winter I tested a Binks carburetter on several makes of machines, under appalling conditions. The way these machines stood up to the tests was splendid. One of these machines was an Allon two-stroke. I started on a 100 mile journey, with the roads covered with snow, which made riding difficult, and this is where I found the advantage of the Binks three-jet, ticking over and quick acceleration when required. The machine was fitted with a warming pan extending from the front to the rear of the engine; I also fitted a hot air pipe. These I found a great advantage. The Allon with the extra fitments was all that could be desired. I also tested a 3½ h.p. single-cylinder single-speed (belt driven). The engine was splendid, but I must say that, under the prevailing conditions, the mudguarding could be greatly improved. Surely it is time makers should pay some attention to this essential detail. The belt-driven machines should be protected as much as possible, because, as you know, there is not much chance of climbing a stiff hill with a belt that is soaked through with water, and I am sure it is not doing the engine much good, when it is revving away when one is practically at a standstill. This was my experience in France.

I recently met a rider, on one of my journeys, who had a Binks fitted. He told me he had tried all sizes of jets but was unable to get satisfaction. Of course I tendered my help to trace his trouble. I took the jets out, and this is what I found fitted: 1st pilot 4, 2nd pilot 00. main jet 2. For this particular machine the jets which I found most suitable were 000, 1, 5, so you see he was entirely in the wrong, not the carburetter. We fitted these jets, and he tells me it is a different machine now. I think users of these carburetters make the mistake of taking all the jets out at once (of course a rider who is used to the carburetter knows how to replace them) and then putting the jets into the wrong jet holes. One must aim at getting a good combination on these carburetters. If I can be of any assistance to your readers in this matter, I should be only too pleased.

I. G. BETHWAITE.

PORT DESIGN IN TWO-STROKE ENGINES.

Sir,—I read with great interest "Excelsior's" letter in your issue of March 8th. I also have a 2½ h.p. two-stroke fitted with a Villiers engine and have found it in every way as satisfactory as his. It has climbed with ease most of the steepest hills in this district and also in South Devon. One of my most pleasing experiences was the ascent of a very steep hill with two hairpin bends carrying a passenger weighing about 9 st. I am inclined to attribute this climbing power to the lowness of the bottom gear, which is about 9½ to 1. L.E.P.

Clifton.

TWO-STROKE V. FOUR-STROKE.

Sir,—Might I be allowed to pass a few remarks as regards "Ixion's" article on "Two Winters on a James Two-stroke"? He says the baby four-stroke is very apt to "dry up" or otherwise complain if driven hard. My experience tells that the baby two-stroke suffers far more from this complaint than does the baby four-stroke. I have driven three of the best known makes of two-strokes, and find that after two or three miles at 25 to 30 m.p.h. it is necessary to take it easy for another half-mile or so.

This is not so with the baby four-stroke. My present mount is fitted with a 2½ h.p. J.A.P., and I can do mile after mile at 30 m.p.h., provided it is well lubricated with good oil and fitted with a good plug. The gears are 5½ to 1 and 12 to 1, while the highest speed obtainable is 50 m.p.h.

Could "Ixion" make a non-stop run from Hounslow to Marlborough along the Bath Road with his baby two-stroke, and make an average of 20 m.p.h.? This I have failed to do on a baby two-stroke, while the baby four-stroke takes the journey quite easily.

"Ixion" says the baby four-stroke has a less pleasing exhaust; this I grant him, but which is the more pleasing to have, a machine capable of maintaining a high engine speed, or a machine with a pleasing exhaust? My baby four-stroke is fitted with an exhaust 4in. in diameter by 11in. long, and I am sure the noise is not objectionable at high speeds.

Perhaps the four-stroke vibrates more at high speeds, but this can be got over by a good saddle and a pair of Terry's spring links.

The petrol consumption is another great thing to study at the present time, the 2½ h.p. two-stroke being about 60 to 80 m.p.g., while the 2½ h.p. four-stroke will do about 90 to 120 m.p.g.

Perhaps some of your readers may have something to say as regards the baby two and four-stroke, but to my mind the baby four-stroke can easily hold its own against the baby two-stroke. FOUR-STROKE.

Ilford.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—Replying to the letter in a recent issue signed "M.C.S.," advocating the granting of driving licences to persons unfortunately but obviously unfitted to hold them, I should like to cite the following case:

Proceeding along a wide, main road, a friend of mine, driving a heavy combination, came into violent collision with a similar type of machine through the driver of the latter—a man suffering from exactly the same disability as your correspondent—losing control when passing and charging into him broadside.

As a result, my friend, after three operations and a sojourn of five months in hospital, is now able to get about again, but hopelessly disqualified for military service.

My experience of motoring is that occasions are constantly arising which call for the exercise of the whole of one's faculties and energies, and that the saddle of a motor is no place for a man possessing but one leg, and still less for one minus an eye in addition. Whilst I have every sympathy with your correspondent in his affliction, I think he should avail himself of the services of a friend and take his place in the sidecar, if only in the interest of other users of the road. C.L.S.

Wandsworth.

Sir,—I can express an opinion on this subject without bias, as my sight and hearing are both good, and I should say that it is the rash driver who is the main cause of accidents—not the deaf or one-eyed man, unless he also comes into the first class, then he is bound to come to grief sooner or later.

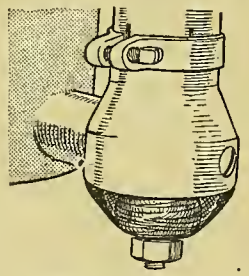
The long list of accidents referred to by Mr. Hitchcock is no argument against deaf or disabled drivers, unless it can be shown that this class of driver is responsible for a large proportion of these accidents, and this, so far, has not been done.

Mr. Gray says that a one-eyed man cannot judge distances. This is undoubtedly true in the case of an object of unknown size suspended in the air, but when a vehicle is on a road, comparison with the surrounding objects gives a very fair idea of size; moreover, motor cycles and their riders differ in size only within small limits. Then again the eye following the road is gradually led up to the object and a very fair idea of distance gained thereby. On the other hand it is very difficult, even for a two-eyed man, to judge distances accurately across a chasm or over water, as I have found when shooting rabbits on the Cornish cliffs with a rifle.

Mr. Hitchcock is right about the rashness of many riders, but surely no one will ride fast in lanes so narrow that two motor cycles cannot pass. JOHN BONYTHON.

PREVENTING WASTE OF FUEL.

Sir,—Reading how to make and fit a "carburetter drip cup," by "Chinook," reminded me of an arrangement I fitted to a single-jet B. and B. on my four-stroke at the beginning of the winter. Having dismantled the carburetter for cleaning purposes, I proceeded to see what could be done to catch the petrol which overflows from the jet after flooding. This arrangement consisted of a few turns of asbestos string wound round the lower portion of the casing carrying the jet, and secured to it with copper wire. At the same time I fitted a gauze air filter under the primary air supply.



Another device to prevent drip from the carburetter.

I.O.W. MECHANIST.

STARTING ON ACETYLENE.

Sir,—Although I have never used acetylene in connection with a motor, I have amassed several facts about it as a student of chemistry. Acetylene liquefies at 82° and solidifies at 91°. Liquid and solid acetylene are explosive, developing a pressure up to 100,000 lb. per square inch, so that their manufacture and use is prohibited in Great Britain. Compressed acetylene and several of its compounds, especially with copper and silver, are explosive. When burnt with a large amount of air it not only produces great heat, but is highly dangerous. The chemical formula for acetylene is C_2H_2, and another name is ethine. Acetylene polymerises under the influence of heat, and a great number of organic compounds can be built up from it. If water is dropped on to calcium carbide a great deal of heat is generated, which may cause the gas to decompose into compounds which choke the ordinary burner in a lamp, so that carbide should really be dropped into an excess of water. This tip may be useful to those who have trouble with lamps. There is no need for me to enter into its manufacture, although it may be interesting to know that carbide is manufactured by the fusion of a mixture of ground limestone and anthracite in an electric furnace. H. G. GREY.

"FLAT TWIN" GOES IN AMERICA.

Sir,—Sure it is a long time since we tapped the old L. C. Smith and mailed you a letter, but we keep reading the "Blue 'Un" just the same, and it comes regularly, too. Don't imagine a ship with a load of *The Motor Cycle* in the hold was strafed by a U boat, with all of the Huns' wonderfully terrifying "ruthlessness." "Boo!" says the Kaiser. But nary a jump does he get, from neutral or belligerent.

A rider of a Cleveland two-stroke on an ice-covered lake near Newark, N.J. The photograph was sent by E. B. Holton, whose letter we publish on this page.

Nix on the war talk; we're neutral; we don't give a hang which one of ye licks Germany.

Our main reason for disturbing your peace by unseemly levity—and I have no doubt that you get a little tired of the minor note all the time—as I started to say, our main reason for writing was to inform you that the term "flat twin" goes in the motor cycle crowd I trail with, no matter what the Hendee officials say about horizontal or any other type of twin they would like us to call it by. Flat twin is short and sweet. Why clutter your vocabulary with a long word? We pause for reply.

We know nothing at all about the M.A.G. or the A.B.C., but Mr. de Lissa surely did pull a "bone" when he started in "sarkastik" like at Mr. Bradshaw; and, from the discussion, we come to the conclusion that the A.B.C. must have Mr. de Lissa worried, or why the peeved expression?

Mildly curious, we would like to know what kind of riders you have over across, when they prefer the thumping single to a twin.

Will close with the hope that you knock out the Germans before the summer months roll round.

Catchin' your eye, and wavin' our hand, we wish you as good as we hope for ourself. So long.

Newark, N.J. E. B. HOLTON.

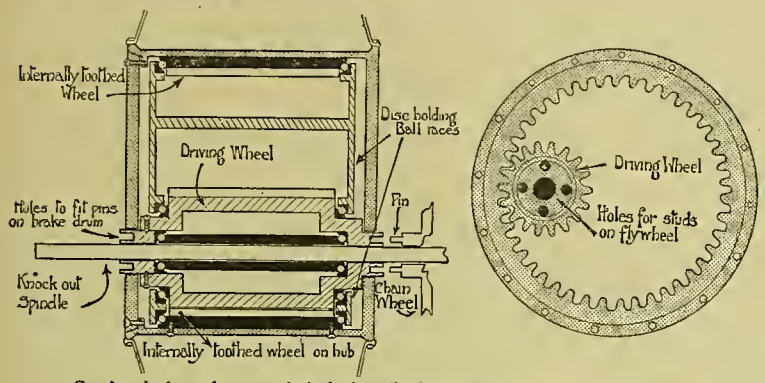
COMMENTS ON THE POST-WAR MATCHLESS.

Sir,—Referring to "Little John's" comment on the post-war Matchless in your issue of March 8th, your correspondent is in error in stating that the detachable wheels cannot be taken out without lifting the machine up, and the changing of a wheel is most certainly not a two-handed job. A recent test under ordinary road conditions proved that either wheel could be removed and replaced by the spare in four minutes, including the time required to fix the replaced wheel to its carrier. This test was carried out on the road on a wet day with the machine dirty by one of our mechanics, and if 50% extra time is allowed for the less expert use of tools by an ordinary rider, the time required proves that it is not the awkward operation your correspondent supposes. The suggestion of one stand to jack up both the bicycle and the sidecar wheel is one that has been considered by ourselves, and we have no doubt other sidecar machine designers. It has one great disadvantage, that if the machine were detached from the sidecar it would be minus a stand, as the stand for the combination would obviously be of such a design that it could not be used on the bicycle alone. This point is perhaps not of so much importance for home trade, where there is not a large demand for powerful solo machines, and where sidecars are rarely detached, but for a manufacturer who, as in this case, wishes to cater for the Colonial solo rider and the home sidecar enthusiast with one design of machine it is a matter of some importance.

H. COLLIER AND SONS, LTD.

ECCENTRIC HUBS.

Sir,—I was interested in the article on eccentric hubs as a form of rear springing, and the suggested design for a doubly eccentric hub in your issue of March 1st. Why not cut teeth internally in the hub and mount a gear wheel on the spindle driven by the engine? A knock-out axle would be used, the drive transmitted by dogs on the chain wheel, as shown in the sketch. The design is really not so complicated as it at first appears. The device would also act as a reduction gear and enable a smaller chain case to be used. Further, the chain case would not move, and could be anchored on to lugs on the frame, thus eliminating rattles.



Sectional view of eccentric hub described in a letter from R. J. Duncan on this page.

R. J. DUNCAN.

POST-WAR MODELS.

Sir,—I shall be very glad to have the names and addresses of British manufacturers of motor cycles who have now fixed upon a definite post-war programme.

I am proprietor of the Bombay Cycle and Motor Agency, of New Queen's Road, Bombay, popularly known in the East as "the leading motor house of Asia." And any information which reaches me in answer to this letter will be very useful, and will be most gratefully received.

Neuilly, Paris. K. D. WADIA.

CLEANING MUDGUARDS.

Sir,—Referring to the article and illustration in *The Motor Cycle* of February 22nd signed by "Chinook," I may say that I have been using a similar plate for some time. By using paraffin, however, I clearly saw that a copper asbestos washer was necessary over the plate at both valve caps, in addition to the one mentioned by him. I have frequently noticed complaints in articles written on the inadequate mudguarding of motor cycles on the difficulty of cleaning out mudguards, and the seeming inability of manufacturers to concentrate any genius upon the subject. There is a very easy method of clearing out the accumulation of stiff mud. Simply fasten a cord of accommodating thickness round the rim and tyre, walk the machine forwards and backwards, and out comes the mud. R. G. HOWARD.

FORCED INDUCTION FOR FLAT TWINS.

Sir,—I thank Messrs. "M.C.B." and Maitland Edwards for their criticisms on the above subject. Admittedly, automatic valves have been found wanting; but have they been tried in piston heads away from the baneful influence of centrifugal force—which must be a great drawback when a.i.v. are used in rotary engines? "M.C.B." also overlooks the fact that the motor cycle engine does not require the abnormal valve timing of an aero engine.

The abolition of the long induction pipes is, perhaps, not a great point, although my experience is that the most exasperating of trouble is generally traced to the induction system. Again, if it is necessary to lag a pipe, is not there something wrong in the design?

I am sorry Mr. Maitland Edwards cannot see my point *(c)*. Surely he must understand that I had in mind an engine with alternate firing, and with a double throw crankshaft. The induction of twice the c.c. of a cylinder, and how, on compression by the returning pistons, the gas is practically forced into one cylinder, seems so obvious that I cannot venture on your space with a more lengthy description. The pre-ignition theory is interesting. I do not think, however, even at full throttle, the compression would reach anything near this stage. The piston rings of flat twins are notoriously free, so why should the valve gum up?

With regard to accessibility, this would be child's play compared with the job I once had of dismantling a silencer and exhaust pipe from a well-known single-cylinder machine—foothoards, clutch pedal, magneto, and gear had to come down first!

I suppose I must accept Mr. Maitland Edwards's statement that it is impossible to fit a valve in a small piston. On the other hand, I will say that I have found a small a.i.v. more efficient, comparatively, than a large one.

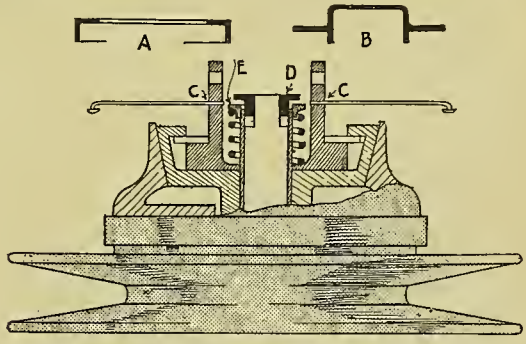
In the case under discussion, the spring may lose its temper, although coming in contact with cool gas at each stroke, but a little thought will show that the spring could *very nearly* be dispensed with. Mr. Maitland Edwards will surely admit that if 750 c.c. of gas is compressed and fired in a 500 c.c. engine it would develop more horse-power than if only 500 c.c. of gas were used in the same engine.

As "M.C.B" (R.F.C.) says, the idea seems very attractive—on paper. C.L.V.R., 2872.

Wimbledon.

OVERHAULING AN ENGINE-SHAFT GEAR.

Sir,—I read the excellent article by "Alpha" on N.S.U. gears, but as few readers possess a lathe or radial drilling machine, I offer the following as a simpler method of dismantling the gear. The gear can be held in an ordinary vice, a piece of old belt laid in the groove of the pulley. After removing the ring, the parts A and B, two holes will be found at C. Loosen nut D one-quarter of a turn, then enter a spoke in each hole C, with a thin screwdriver tap crown E, at the same time pressing in the spokes till they rest on top of E They will then hold the spring in place,



Showing method of dismantling N.S.U. gear without the use of a lathe.

and the nut D can be screwed off and the parts taken adrift. To release the spring, place a large nut on the block of wood on E and compress in the vice. Take out the spokes and release the spring gradually. To reassemble, reverse the procedure.

This I think will interest not a few of your readers. I enclose a sketch which is entirely drawn from memory.

D. THOMAS, Chief Mechanic.

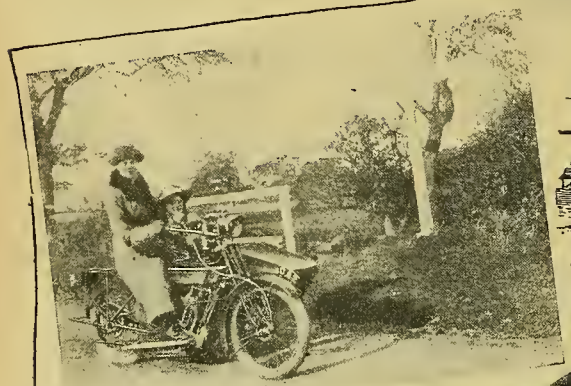
[Alpha's original article appeared on pages 154 and 155, issue of February 22nd, 1917.—ED.]

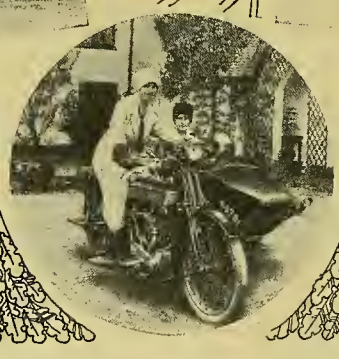
Give a definite order to a newsagent for the regular supply of this journal every Thursday, and so save waste by chance sales.

LADIES AND THE MOTOR CYCLE.

AN ever increasing number of ladies are turning to the motor cycle, and the war is giving many an opportunity of showing their usefulness either in the Red Cross service or A.S.C. fodder department, and in many other branches of patriotic work. They are, too, an adjunct to various businesses. "Mother Grundyism" is now dead, and rightly so, for rarely is criticism levelled at the lady motor cyclist in these days, whether she be steering an 8 h.p. sidecar or a baby two-stroke. Strangely enough—is it another instance of the perversity of women?—we see as many ladies on fairly high-powered machines as we do on low-powered mounts. Conspicuously able, too, is their manner of handling motor cycles, speaking generally. We can safely say that there is as much genuine enthusiasm exhibited by the fair riders, when once they have tasted the joys of motor cycling, as is shown by the so-called sterner sex.

It is not necessary to adopt an unbecoming garb as many still suppose. To support this statement we instance the photographs we reproduce which are taken from an attractive publication, "The Lady Drives," just issued by the Enfield Cycle Co., Ltd., Redditch. This brochure is splendidly got up. Photographs show (top) Miss Violet Hassall, of Malpas, on a 2¼ h.p. two-stroke; (left) Mrs. C. P. King, of Birmingham, who has driven an Enfield sidecar for four years; (right) Miss Elsie Toone, of Exmouth, another lover of the two-stroke; and (bottom) Mrs. Douglas Prentice, an enthusiastic rider of a 6 h.p. outfit, and in the sidecar Mrs. E. F. Baxter, whose motor cyclist husband, it will be recalled, won the Victoria Cross.

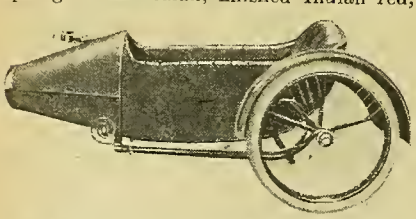




Types of Phoenix Sidecars.

MESSRS. PHŒNIX SIDECAR WORKS, 736, Holloway Road, London, N., have several attractive sidecar models for 1917, and inform us that they are in a position to guarantee all deliveries from stock.

Their 1917 advance leaflet includes, among other models, a very attractive sidecar arranged for attachment to the spring frame Indian, finished Indian red, and provided with quick detachable joints and 28 × 3in. wheel and tyre. Two double-seaters are also included, and a special model single-seater for Harley-Davidson machines. The tandem models are roomy enough for two passengers, and have every refinement.



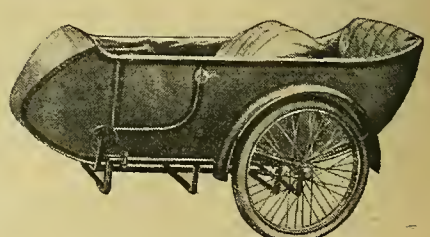
A semi-torpedo model specially designed for fast touring in conjunction with 3½ h.p. motor cycles.

Attractive Lightweight Models.

Among the most interesting sidecars on the list are the lightweight models, which are specially designed for machines up to 4 h.p. The weight of model 100 is 65 lb. It is of attractive and unconventional lines.

The racing pattern sidecar is particularly taking in outline, being projectile-shaped, and suspended fore and aft in a special design of body to give low riding position. The body is well upholstered, and fitted with a large locker at the rear of the seat. This model can be supplied fitted with either a coachbuilt or a cane body.

Messrs. Phœnix also manufacture tradesmen's sidecarriers, and inform us that they specialise in building to customers' design. The quick detachable joints now fitted to all models are of really efficient design, and the bodywork of the various models brought before our notice is certainly tasteful in lines and finish.



A specimen of the Phœnix double-seater sidecar.

QUESTIONS AND REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C., 4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects

Logged Petrol Gauge Float.

The cork float of my petrol gauge on a 1913 Triumph having become logged through the use of benzole (thus rendering the dial inoperative), do you know of a solution with which I could cover the cork so that it may again withstand the action of petrol? I have tried several garages with a view to having it recoated or a new small drum fitted made of a light metal (aluminium for preference), but none of them can suggest anything to help me.—KS 188.

Either fit a new piece of cork to the gauge, or allow your present cork to dry and then coat it with a petrol-proof varnish.

A Red-hot Exhaust Pipe.

Would you kindly tell me why, while running my machine on its stand, the exhaust pipe, leading from the cylinder to the silencer, becomes red-hot? The machine is a 3½ h.p. 1915 T.T. model.—A.G.Q.

This is nothing uncommon, and is due to the passage of the exhaust gases through a bend in the pipe raising the said pipe to a high temperature. Sometimes it occurs when the machine is travelling along the road. Occasionally the fact may be ascribed to too weak an exhaust valve spring or to a dirty engine, but probably a retarded spark is the commonest cause.

Lack of Power.

I had a short run on a 1914 4 h.p. three-speed Triumph motor cycle recently, and found (1) a decided lack of power, (2) a tendency to overheat and knock, and (3) that the clutch would not disengage. Would you kindly tell me how to remedy these faults? I believe the engine was cleaned out recently. (4.) Is there a petrol substitute for sale at garages which can be purchased without a petrol permit? (5.) If so, what is the price of it? and (6) is it detrimental to the engine?—J.K.

(1.) The lack of power may be due to the valves requiring to be ground in. (2.) The tendency to overheat and knock may be due to too weak valve springs, and the fact that the carbon deposit requires to be cleaned off the cylinder head and piston. (3.) The fact that the clutch does not disengage is merely a matter of clutch adjustment, or may be because the clutch requires to be washed out with paraffin, after which thin oil should be injected. From what you say in your letter, it does not seem as if the engine has been cleaned out recently. (4.) No petrol substitute requires a permit at present. (5.) These substitutes vary in price from, say, 1s. 10d. to 2s. 9d. per gallon. (6.) Provided the vaporisation is good, a substitute is not detrimental to an engine.

Petrol Substitutes.

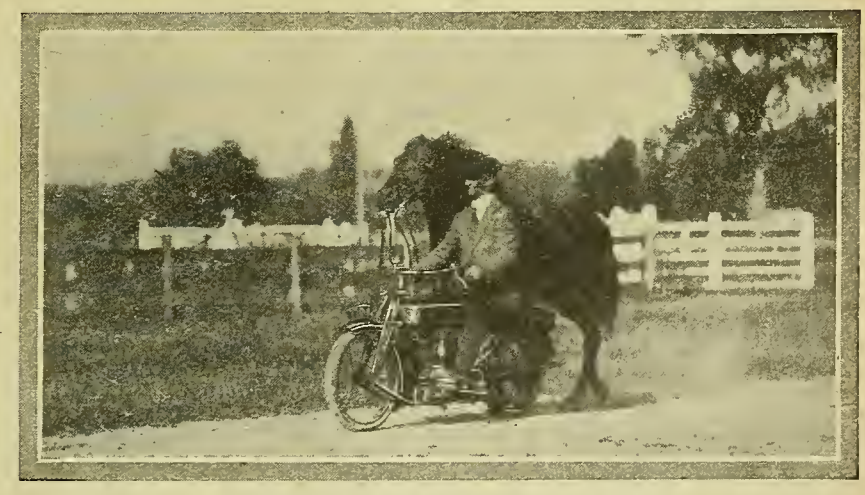
The following paragraph is taken verbatim from page 222 of "The Daily Mail Year Book, 1917": "Fuel Substitutes.—During the summer of 1916 the petrol card was issued, and on this only a very limited quantity of spirit can be obtained. This further restriction led to the marketing of various fuel substitutes, the use of which was soon prohibited by the Conway and Bournemouth justices, who held that any form of substitute which could drive a motor car was petrol in a legal sense. Notices of appeal have been filed against these judgments, and the final decision will be left to the High Court. *In the meanwhile any substitute fuel, or mixture of petrol, paraffin, alcohol, or light hydrocarbon oils, if bought as such, must, under a penalty of £100, be entered on the licence cards as petrol, and as forming part of the monthly allowance.*" Would you kindly inform me whether the last paragraph is a correct statement of the law now governing the use of "fuel substitutes" by motor cyclists?—H.N.

The reference to the prohibition of the Conway and Bournemouth justices is incorrect. This did not refer to motor cars, but only to motor chars-à-bancs. A few people, who did not take the trouble to read the regulations properly, including certain police officers, made it unpleasant for several motorists in various parts of the country, but afterwards had to apologise for their over-zealousness. At the present time one may purchase petrol substitutes, such as can be obtained, without let or hindrance, and it is to be hoped that no interference on the part of the authorities will be made with the purchase of these heavier fuels.

A Tail Lamp Tell-tale.

I have been warned several times of my tail light being out, and have now got to the "final" stage. Would you kindly let me know a tip for ascertaining whether the lamp is alight?—J.H.

Have a lamp with a white glass on the off side shining on to the road, which you can see by glancing momentarily behind you. If it is an electric lamp you can fit two lamps in series, so that both will be alight at the same time, and when one goes out the other will do likewise. The second lamp could be used to illumine a speedometer or watch.



MAKING THE MOTOR CYCLE USEFUL.

A Melbourne motor cyclist sends the above photograph of his 6 h.p. New Hudson twin, which demonstrates the flexibility of the modern motor cycle, and incidentally the tractability of the pony.

Failure to Start.

I shall be greatly obliged if you would throw any light on the trouble I have with my 3½ h.p. Triumph. It has run well till lately, but now I find great difficulty in starting. The compression is good, the spark is good, the timing is correct, and there are no air leaks. A Senspray carburetter is fitted, which appears to be in good order, and the jet is clear. What would you suggest, as I cannot start at all?—F.C.B.

Try blocking the main air intake of the carburetter this cold weather. Also try a different brand of petrol. Some brands of petrol are very bad at the present time. We take it for granted that the magneto points and connections are good and clean.

Squeaky Valves.

The valves of my 2¾ h.p. A.J.S. have recently developed a most decided appeal for oil—in the shape of a pronounced squeal. I oil as advised—a pumpful every five miles—but in spite of this, after twenty or thirty miles, the trouble begins. (1.) Can you suggest a permanent remedy? (2.) Would drilling a $\frac{1}{16}$in. hole at the top of each valve guide—for the purpose of oiling—be advisable?—J.S.F.

(1.) Take the valves out of the engine, clean them with a rag soaked in petrol, and then dust a little powdered graphite upon the valve stems and down the valve guides. (2.) Drilling a hole would, we think, hardly be necessary. The graphite should last some considerable time.

Curious Magneto Trouble.

Is it troubling you too much to enquire the cause of and a remedy for the following magneto defect which has appeared on my machine, viz., leaking of the shellac composition from the cover of the armature winding when the machine is running and has become fairly warm? The leakage is not very great, but sufficient to form a coating between the armature and the magnets that gums up so stiffly when the machine has cooled down that considerable force is required to turn the magneto-shaft. The treatment in the local workshop appears to be an endeavour to remove as much of the remaining shellac as possible by baking the armature, and so effectually to stop further leakage. But that remedy appears to me rather drastic. *(a)* Is it a recognised and safe one, and is not the insulation of the winding imperilled by it? *(b)* Is there any objection to sealing with a coat of new hard shellac the spaces between the armature poles, so that nothing further can leak from the winding cover? The fault is one I have never seen mentioned in your columns, but one not infrequently met with out here on machines that are no longer new. Perhaps the moist hot air of the tropics causes deterioration of the shellac?—H.F. (Kuala Lumpur, F.M.S.)

It appears to us that the trouble from which you are suffering may not be due so much to the climatic conditions as to the position in which your magneto is situated. If it is very close to the engine the heat thereof, plus the climatic conditions, might raise the temperature to such an extent that the shellac would soften. It, however, would not crack until a temperature of 230° had been attained, and if such a temperature were reached continued running at this heat would affect the insulation, and very soon lead to a breakdown. *(a)* The local workshop treatment is a drastic remedy which deals only with the effect, whilst the cause of the trouble—overheating—should have first attention. The cure seems to be to remove the magneto to a more favourable position, or to devise some method of deflecting the heat; or perhaps a means of cooling might be contrived. If you had let us know the make of your machine and also the make of the magneto we might have been in a better position to have assisted you. *(b)* We do not think it would be practicable to seal the space between the armature poles with a coat of new, hard shellac. The fault is certainly one which does not occur in this country.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

Extra Air.

I am a motorist of some years' standing, both in New Zealand and Australia, but during the last six years have ridden the Douglas only, possessing four mounts in that period. To each of the last three models I fitted an extra air cock in the induction pipe, with marked improvement in power. The agents tell me that if this is so my control is unbalanced; but it seems strange that all models should similarly respond to the innovation. I do not open the cock until the machine is well under way, when, having the normal air lever advanced to maximum intake and without touching the throttle, the machine leaps ahead. The cock is placed exactly over the middle of the intake from the carburetter, and I am not aware of any disadvantage resulting from the fitment. Perhaps you will kindly advise me on this point.—South Australia.

There are one or two things which may account for your engine taking more air than the carburetter permits. Possibly your jet is on the large side, in which case a smaller one would adjust matters. If your fuel consumption is moderate and your engine pulls well and does not overheat you may just as well continue as you are, using the auxiliary air cock. The idea is good. Then again, the atmospheric temperature may have some bearing on the point. Hot air is considerably expanded, and, therefore, a greater volume can be used than if the air is cold and contracted. You are quite right in using the auxiliary supply if you find the engine will take it. The cock should point downwards or sideways if it is of the cup variety, so that it cannot accumulate sand or grit, which would ultimately be drawn into the engine. You might try the effects of a smaller jet by way of experiment.

READERS' REPLIES.

Sparking at Contact Breaker.

With reference to the query of your correspondent "P.N." in the issue of March 1st, page 200, I might say that my two-stroke magneto sparks between the contact breaker point when running, but when I sit on the machine I always find one push is enough to start it. The magneto is a Thomson-Bennett, type AM1.—T.H.L.

Uneven Firing.

Your correspondent "W.P.S.," on page 199 of *The Motor Cycle*, appears to have had exactly the same trouble as myself with a 2¾ h.p. twin Enfield. Mine is a two-speed model about 1912, with, I think, a Motosacoche engine. The compression is best in the back cylinder, "the one that would not fire." I tried all the usual dodges, as well as several unusual ones, but was quite "whacked" for some time. There was a beautiful spark, and this put me off the scent until I noticed the occasional absence of spark in the back plug. I then had the magneto overhauled and new centre insulator put in. This greatly improved it, and the engine will now fire on both cylinders. "W.P.S.'s" back cylinder is less likely to fire than the front, as the compression offers a greater resistance to the electric spark.—LH 2415.

RECOMMENDED ROUTES.

Blaenavon to Burslem.—J.J.

Blaenavon, Abergavenny, Pontrilas, Hereford, Leominster, Ludlow, Church Stretton, Shrewsbury, Hodnet, Market Drayton, Newcastle-under-Lyme, Burslem.

Wakefield to Wisbech.—A Reader.

Wakefield, Doncaster, East Retford, Newark, Sleaford, Swineshead, Long Sutton, Wisbech. Approximately 120 miles.

Reading to Chester.—E.C.B.

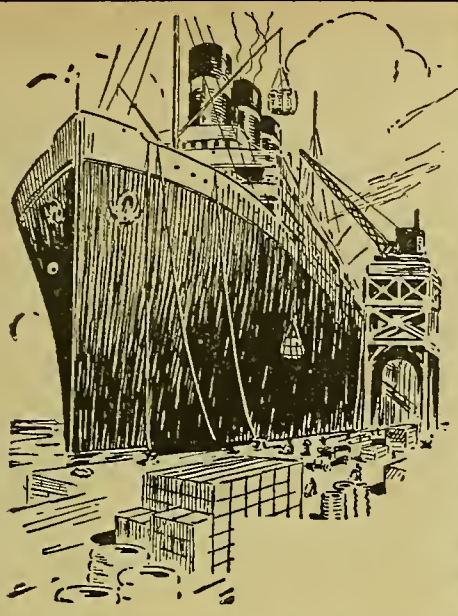
Reading, Wallingford, Oxford, Chipping Norton, Bourton-on-the-Water, Broadway, Evesham, Worcester, Kidderminster, Bridgnorth, Wellington, Hodnet, Whitchurch, Tarporley, Chester.

Wareham to Stafford.—C.E.F.

Wareham, Almer, Blandford, Longbridge Deverill, Warminster, Bath, Nailsworth, Stroud, Gloucester, Worcester, Kidderminster, Bridgnorth, Shifnal, Newport, Stafford.

Margate to Bristol.—E.P.

Margate, Canterbury, Charing, Maidstone, Riverhead, Westerham, Redhill, Reigate, Dorking, Shere, Guildford, Farnham, Odiham, Basingstoke, Whitchurch, Andover, Ludgershall, Upavon, Devizes, Melksham, Box, Bath, Bristol.



FOOD or TYRES?

SOMEWHERE, lying alongside a quay in a seaport of a country taking no active part in this war, is a transport actually accepting as a preferential cargo tyres instead of food for this country. We DON'T need tyres, but we DO need food, and in view of the recent import restrictions rendered necessary to maintain Britain's food supply

SHOULD THIS CONTINUE?

To substantiate the above statement, the Board of Trade returns for 1916 show that £2,423,865 went out of this country (think of this fact alone!) in the purchase of these imported tyres, the conveyance of which meant a loss of nearly two million cubic feet of shipping space for the transport of food and munitions.

ALMAGAM
AVON
BATES
BELDAM
NORTH BRITISH CLINCHER
DUNLOP
HENLEY
KEMPSHALL
LEYLAND
MACINTOSH
MIDLAND
MOSELEY
PALMER
SPENCER-MOULTON
WOOD-MILNE

This must be stopped; it can be stopped, if every British user will purchase only British tyres. British tyre manufacturers have ample facilities to supply every home need.

Remember, not all tyres with British-sounding names are British, but the adjoining list, although not complete, affords you a choice of fifteen all-British products.

THE DUNHILL M.C. JACKET & OVERALLS

AS SUPPLIED TO H.M. GOVERNMENT.

Planned on the saddle, so to speak, the garments combining smartness with perfect ease and freedom.

Built of Paramatta Twill of the finest Proofing, and quite impenetrable to wind and rain.

The quality is unequalled anywhere for the price.

GUARANTEED ABSOLUTELY WATERPROOF.

PRICES:

Jacket with belt £2-2-0
Seatless Trouser Overalls £1-4-0

Dunhills Ltd.,

359-361, Euston Rd., London, N.W.

2, Conduit St., W.

Manchester: 90-92, Cross Street.

Glasgow: 72, St. Vincent Street.

BOWDEN WIRE LTD

Contractors to H.M. & Allied Foreign Governments

Established 1897.

Makers of the Famous Wire Mechanism and Controls

BOWDEN WIRE, Limited, being wholly engaged upon production for the British and Allied Governments, are unable to execute any orders for private purposes until further notice. They have in stock certain goods suitable for replacements. Customers are invited to state their requirements in this respect, and, if possible, these will be met.

LONDON
VICTORIA ROAD NW
WILLESDEN JUNCTION

Godbolds.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed ——— & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed, "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C."

☞DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged, when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

ABINGDON, 3½h.p., T.T., 2-speed, perfect condition; £220. 20, Canterbury Rd., Kilburn. [9518

1912 4h.p. Abingdon, free engine, mechanically perfect; cash £24.—Gardner, Cavendish St., Chichester, Sussex. [X7831

1911 Abingdon King Dick, new cylinder and piston complete, Bates tyres, Dunlop belt, very reliable machine; £18.—Walden, Woodville, Stourton Caundle, Blandford. [9495

A.J.S.

FOR Sale, new 1916 A.J.S. 6h.p. combination.—Wood, Raisthorpe, Malton. [X7725

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [X7098

A.J.S. 1914 6h.p. Combination; £55.—Particulars, Harris, 48, Rattray Rd., Brixton, S.W. [9493

A.J.S., new 1917 model, 6h.p., actually in stock; first cheque for £84 secures.—Hopkins, New St., Ledbury [X7777

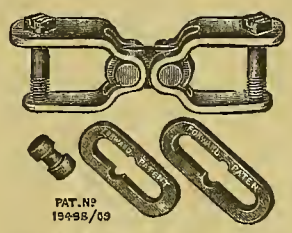
A.J.S. Outfit, in splendid condition; any trial; £84; extended payments arranged.—Service Co., 292, High Holborn, London. [X7738

A.J.S. 1916 6h.p. Combination, excellent running order, P. and H. head lamp, Lucas rear, Stewart horn, interchangeable wheels, engine just cleaned and overhauled; £95, or nearest offer.—Fletcher Bros., Wirksworth, Derbyshire. [X7699

Give your belt a chance——join it with a

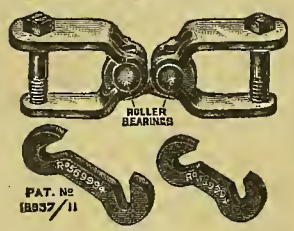
FORWARD

fastener and so ensure maximum efficiency.



The FORWARD 1/6

The FORWARD Leather-covered LINK 1/-



The KING HOOK
Detachable 1/-
Adjustable 1/3

Ask for Catalogue.

FORWARD MOTOR Co.,
35, Forward Works,
Summer Row, BIRMINGHAM.

VEVO THREE SPOUT INJECTOR

Polished and Plated.

No. 74.
Post Free,
2/9
Net.

For injecting Grease and Heavy Oil into Gear Cases, Hubs, etc. A most useful article for all speed merchants.
Thousands are being supplied to the Government.
Vevo Works, PARK LANE, BIRMINGHAM.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. 1916 (October) Combination, spare wheel, horn, lamps, practically absolutely new, unsoiled; £100, lowest.—Mrs. Davies, Albion House, Presteigne. [X7715

A.J.S., latest 2¾h.p., 3-speed (Nov., 1916), horn, lamps, run 300 miles; exchange with cash for 6 h.p. combination.—Box 791, c/o *The Motor Cycle*. [X7830

1914¾ 6h.p. A.J.S., with No. 5 Gloria sidecar, fully equipped, and been kept in fine condition; price £70.—Foster, Peel Bridge, Ramsbottom, Lancashire. [X7826

A.J.S. Combination, 6h.p., latest model, spare wheel, hood, screen, lamps, Watford speedometer, horns, done 3,000 miles; £90, or offer, cost £120.—Cassels, Westfield, Drumchapel. [X7754

A.J.S. (Oct., 1914) 6h.p. 3-speed Combination, detachable wheel, folding wind screen, hood, spring pillion seat and dressguard, speedometer, numerous spares and accessories, including a good suit of overalls; owner having to join up, will sacrifice this smart turnout, all in perfect order, for 60 gns.; can be seen and tried by appointment.—Buckingham, 2, Formosa St., Maida Vale, W. 'Phone: 6018 Pad. [X7707

Alldays.

1917 Allon, 2-speed, in stock.—Pickering, Mardol, Shrewsbury. [X6779

1915 Allon, 2¾h.p., 2-speed, E.I.C., Senspray; 24 gns.—Railway Garage, Staines. [9602

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

1914 Alldays Matchless, 2-speed, footboards, etc.; only £33.—Parker and Son, St. Ives, Hunts. [9554

1916 Alldays Allon, well kept, mechanically perfect, usual accessories; £30, offers.—Watkinson, Brigg, Lincs. [X7667

ALLDAYS-ALLON, 2¾h.p., brand new, delivery from stock; £44/2; extended payments arranged.—Service Co., 292, High Holborn, London. [X7737

ALLON.—All 1917 models in stock, 36-45 gns.; exchanges and deferred payments arranged.—Maudes', 100 and 136 Gt. Portland St., London, W. Tel.: 552 Mayfair. [7387

Ariel.

ARIEL, 3½h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [9211

ARIEL, 1914, commercial, 3-speed countershaft; £42.—48, Dalberg Rd., Brixton, S.W. [9514

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

ARIEL, 3½h.p., in good condition; £20; officer leaving for Front.—8, Marine Crescent, Degauwy, Wales. [9342

RIDER TROWARD'S, 78, High St., Hampstead.—1913 Ariel, re-enamelled, variable gear; 18 gns. [9443

ARIEL, the reliable motor cycle, 3½h.p. single, and 5-6h.p. twin models; delivery from stock.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0889

Arno.

1915½ 3½h.p. Arno-Triumph, almost brand new, mechanical horn, lamps, etc.; £25.—20, Whitley St., Reading. [9599

REAL Bargain.—All red Arno motor cycle, 3½h.p., 3 speeds, 2 coachbuilt sidecars, 3 P.H. lamps, spare belt, £2 worth of engine spares, spare tyre and tube, tools, etc., Binks carburetter; trial allowed; reason of selling, owner buying car; £40.—349, Leigh Rd., Howe Bridge, Atherton, near Manchester. [X7409

MOTOR CYCLES FOR SALE.

Auto-Wheels.

AUTO-WHEEL, practically new; bargain, £9, or offers. —Green, Landkey, Barnstaple. [9569

AUTO-WHEEL, 1914, new Palmer tyre, perfect running order; £5/10.—Barrow, 14, St. Andrew's Rd., Villesden Green. [9399

TWO Genuine Wall Auto-Wheels, first-class condition and running order; £8/10 and £10.—Murray, 37a, Charles St., Hatton Garden, Holborn. [X7789

Bat.

1914 6h.p. Twin Bat, 3-speed countershaft gear, coach sidecar; £46/10.—Motor Exchange, Horton St., Halifax. [9453

BAT, 1912, 6h.p. T.T., 3-speed model, fast bike, good condition; £32.—P. J. Evans, John Bright St., Birmingham. [X7815

3½h.p. Bat-Jap, spring frame, very fast; £18; exchange with cash for 6h.p. J.A.P.—Howard, 172, St. Ann's Rd., Tottenham. [9558

BAT-J.A.P., 6h.p., spring frame, new Bosch, B. and B., Mabon clutch, new tyres, lamp, horn, guaranteed, good condition, 4 to 40; any trial; £17/10.—M. Jones, Post Office, Bramshott Camp, Hants. [X7759

Bradbury.

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage; £49/10.—Motor Exchange, Horton St., Halifax. [9445

BRADBURY, 4h.p., 1913, N.S.U. 2-speed gear, kick starter, and coachbuilt sidecar; £32.—Burton, Primrose Villa, Holmes Chapel, Cheshire. [X7801

1914 4h.p. Bradbury, 2-speed, kick starter, Bosch, Dunlops, Lucas lamp, and coachbuilt sidecar; £40.—Heald, 20, Beaufort Rd., Brooklands, Cheshire. [X7803

BRADBURY, 1914, 4¼h.p., 2-speed gear, countershaft, chain drive, in splendid condition; £32; accept lightweight part payment.—Young, 64, Tilton Rd., Small Heath, Birmingham. [X7661

BRADBURY Combination, 1914, 4h.p., Bosch, Binks, kick start, long aluminium footboards, long exhaust pipe, fully equipped; £40; lightweight part exchange.—45, Coral St., Waterloo Rd., S.E. 1. [9551

Brough.

1915 Brough, 3½h.p., opposed twin, countershaft 2-speed, overhauled by makers, practically new condition; 50 gns.; consider exchange other motor cycle and cash adjustment.—Toura Motors, 285, Weelsby St., Grimsby. [X7708

Brown.

BROWN, 3½h.p., U.H. waterproof, B. and B., drip feed lubrication, powerful; £12/10.—160, Aubrey Rd., Small Heath, Birmingham. [X7769

B.S.A.

1917 B.S.A.'s in stock.—Lambert's, Thetford. [9154

B.S.A., 1917 models H and K, with sidecars, in stock. —Moss, Wem. [X7809

1917 B.S.A., chain drive; in stock.—Pickering, Mardol, Shrewsbury. [X6775

COLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

1912 B.S.A., 3½h.p., fixed engine, not used since 1914, perfect; £23.—Box 784, c/o *The Motor Cycle*. [X7728

B.S.A., 1917, chain-cum-belt model, used 3 months, excellent condition; £59.—Sharman, Brackley. [X7778

1915 B.S.A. Model K, Rover sidecar, fully equipped; £55.—Coope, Nell Lane, West Didsbury, Manchester. [9380

B.S.A., 4¼h.p., 1914, chain drive, 3-speed, Cowey, new tyres and sidecar; £42, bargain.—123, Pinstone St., Sheffield. [9475

B.S.A., 3½h.p., 2-speed, Montgomery C.B. sidecar, fully equipped, and guaranteed perfect; £34.—20, Whitley St., Reading. [9597

1912 B.S.A., 2-speed, free, runs faultlessly on substitute, excellent condition; £24, or offer.—251, Bentley Rd., Doncaster. [X7783

B.S.A., 1914, 4¼h.p., 3-speed, chain drive, kick starter, a splendid running machine; £40.—Alexander's, 115, Lothian Rd., Edinburgh. [9571

1913 B.S.A., 2-speed, free engine, new belt, tyres very good; price £30, or near offer; seen any time.—Owner, 27, St. John's Rd., Putney Hill. [9391

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529

B.S.A., 1916¾, 4¼h.p., 3 speeds, etc., new condition throughout, and complete with Watsonian coachbuilt sidecar; £60.—Smith, 199b, King St., Hammersmith. [9573

B.S.A. Motor Bicycles, chain and chain-cum-belt models in stock.—A. Watkins, The B.S.A. Agent, 160, Stoney Lane, and 565, Stratford Rd., Sparkhill, Birmingham. [X7440

B.S.A., 1914-1915, 4¼h.p., all-chain countershaft 3-speed, Mills-Fulford coachbuilt Family sidecar, wind screen, luggage grid, Lucas and Miller lighting sets, Stewart speedometer, etc., quantity spares, perfect condition, only used summer months; £55.—Gill, 17, Rectory Lane, Chelmsford. [9568

COMPARE OUR PRICES

with those ruling as averages, and you will see that, whilst on the average they are actually those asked by private owners, you have the grand advantage of knowing that all our machines are

OVERHAULED & GUARANTEED,

whilst the cost is no higher, and, in many cases, even less, than the average ruling prices.

SECOND-HAND BARGAINS.

SIDECAR OUTFITS.

TRIUMPH, 3½ h.p., 2-speed countershaft, Sidecar £30
ZENITH, 1914, 6 h.p., countershaft clutch model *£50
RUDGE, 1913, 5-6 h.p. Multi, with Rudge Sidecar £40
ENFIELD, 6 h.p., 2-speed, twin, Enfield Sidecar £29
RUDGE, 1913, 3½ h.p. Multi, coach-built Sidecar *£30
SCOTT, 1914, 3½ h.p., 2-sp., and Scott sidecar £47
ZENITH, 1915, 3½ h.p., twin, clutch, and C.B. Sidecar £45
P. & M., 3½ h.p., 1913, 2-speed, C.B. Sidecar *£40
JAMES, 4½ h.p., 1914, 3-speed, Empress Sidecar *£45
SUNBEAM, 1915, 3½ h.p. Combination *£68
SUNBEAM, 1916, 3½ h.p. Combination *£77
ZENITH, 1914, 8 h.p., clutch, and Sidecar *£60
SINGER, 1913, 4½ h.p., 2-speed, and Sidecar £33

LIGHT CARS, Etc.

G.W.K., 1914, 8 h.p., just re-painted £120
SINGER, 1913 (late), 5 lamps, dickey *£140
HILLMAN, 1915, 9.5 h.p., speedometer, little used.*£215
MATHIS, 1914, 15 h.p., 5-seater, dynamo .....*—
SWIFT, 1915, 10 h.p., dynamo, like new.....*£250
BELSIZE, 1912, 10-12 n.p., dynamo *£135
FORD, 1913, 20 h.p., 5-seater, windscreen £60
MORGAN, 1913, 8 h.p., hood and screen.....*£60
CALTHORPE, 1916, 10 h.p., 4 seat, dyna. and start £275
HUMBERETTE, 8 h.p., 1913, wants overhauling £36
SINGER, 1914, 10 h.p.....*£180

SOLO MOUNTS.

DOUGLAS, 1914, 2¾ h.p., 2-speed, T.T. *£35
DOUGLAS, 1915, 2¾ h.p., 2-speed, model V..... £45
DOUGLAS, 1914, 2¾ h.p., 2-speed *£40
DOUGLAS, W. O., 1916, 2¾ h.p., 2-speed..... £50
TRIUMPH, 1912, 3½ h.p., clutch model, Bosch *£25
TRIUMPH, 1914, 4 h.p., 3-speed, Bosch.....*£40
TRIUMPH, 1912, 3½ h.p., Standard touring *£22
TRIUMPH, 1913, 3½ h.p., 3 speed, all accessories ...*£30
TRIUMPH, 1914, 4 h.p., 3-speed (late date) *£42
TRIUMPH, 1909, 3½ h.p., delivered 12.12.08 ..... £17
INDIAN, 1914, 7-9 h.p., clutch model, speedometer .*£40
INDIAN, 3½ h.p., 1915, 3-speed, speedometer £38
B.S.A., 1916, 4¼ n.p., 3-speed, mod. K., speedometer*£54
ENFIELD, 1911, 2¾ h.p. twin, 2-speed, chain drive..*£20
ENFIELD, 1911, 2¾ h.p. twin, Grado gear *£14
HUMBER, 1914, 3½ h.p. 3-speed, water-cooled *£38
CALTHORPE, 1914 (late), 2½ h.p., 2-sp., 2-str. *£22
REX, 1914, 4 h.p., 2-speed, and handle start £25
PREMIER, 1913, 2½ h.p., single-cyl., fine lightweight .. £12
CALTHORPE, 1914, 2 h.p., 2-speed, 4-stroke £15
BAT-JAP, 5-6 h.p., overhead valves, T.T..... £30

Machines starred (*) are complete with lamps, horn, etc

NEW 1917 MODELS.

ROYAL ENFIELD, 2¾ h.p., 2-speed, 2-stroke £44 2
B.S.A., 4¼ h.p., 3-speed, belt, K, 1917 model £64 0
B.S.A., 3½ h.p., Model D, T.T. £52 10
ROVER, 1917, 3¼ h.p., T.T., Philipson pulley ... £61 10
HARLEY-DAVIDSON, 7 h.p., 17F, 3-speed £93 0
HARLEY-DAVIDSON, 7 h.p., 17J, electric equip...£102 0
HARLEY-DAVIDSON Sidecar to either of above.. £24 10

NEW 1916's.

(Note Reduced Prices.)

ROYAL RUBY, 2½ h.p., 2-speed, 2-stroke £32 5
ROYAL RUBY, 2½ h.p., J.A.P., single-speed £28 15
COVENTRY EAGLE, 2½ h.p., single-speed, 2-stroke £30 15
LEVIS 2 h.p. Popular model £29 0

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MOTOR CYCLES FOR SALE.

B.S.A.

B.S.A., 4¼h.p., all chain drive, fitted with speedometer, lamps, and all accessories, 1916 model; £55; extended payments arranged.—Service Co., 292, High Holborn, London. [X7739

B.S.A., Model K, new, but very slightly shop-soiled, £59; also B.S.A. Model K, issued new Feb., 1916, with Hercules £14 coachbuilt sidecar, complete with lamps, tools, etc., £58; this latter outfit is almost new, and represents more than a bargain; also B.S.A. 1916 Model H (all chain drive), with roomy Millford coachbuilt sidecar, with wind screen and all accessories, including head and tail lamps, an outfit of more than usual merit, £60; and B.S.A. 1915 Model K, with low coachbuilt sidecar, completely equipped, overhauled, and thoroughly sound, £52/10. Will intending purchasers please note that we are prepared to give the most candid descriptions concerning any goods we offer, and willingly grant approval, always, because unless a deal can be concluded in a mutually satisfactory manner we prefer to cancel it. We ourselves take whatever risk there is.—If you desire a pleasant, straightforward, and profitable deal, write to Layton's Garage, Bicester, Oxon. [9595

Calcott.

1914 4¼h.p. Calcott, 3 speeds, free engine, and sidecar, good tyres, new tubes, very fast, just overhauled, guaranteed perfect; £40.—H. Sanderson, Pitt Farm, Guyhirn, Wisbech. [X7534

Calthorpe.

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799

CALTHORPE, 1915, 2½h.p., 2-stroke; £20; no fault —Higgins, Broughton St., Brick Fields, Cheetham, Manchester. [9396

1917 Calthorpe, 2-stroke, 2-speed, new; also 1915 Calthorpe-Jap, second-hand, £26.—Pickering, Mardol, Shrewsbury. [X6778

1915 Calthorpe, 2-stroke, 2 speeds; £19/10; owner joined up.—Driver Darke, Waterloo House, London Rd., Sutton, Surrey. [9522

CALTHORPE, 1914, 2-speed, 2¼h.p. Precision engine, dirty condition, otherwise in good order; £10, no offers.—Kemp, Vickers Lane, Louth. [9351

P. J. EVANS, Birmingham and District Agent.—Calthorpe 1917 models in stock; two-stroke and four-stroke lightweights, and 4-5h.p. twins, solo or as combination.—John Bright St. [X7819

Campion.

1917 4h.p. Campion-Jap, Sturmey-Archer 3-speed, countershaft, brand new.—438, Osmaston Rd., Derby. [X7772

Chater-Lea.

CHATER-LEA Combination, 8h.p. twin, good condition; £55.—Cabitt, Chapel St., Tavistock. [X7770

CHATER-LEA, 8h.p., genuine No. 7 combination, 3-speed gear, good condition; £35.—Verney, Dorking. [9214

8h.p. Chater-Lea Combination, 3-speed countershaft gear, and spare parts, nearly new; £75, or offers. —Box L3,331, c/o *The Motor Cycle*. [9412

Chater-Peugeot.

2¾h.p. Chater-Peugeot, mag., Druids, splendid goer; first £10, or 2-speed Sunbeam push cycle and cash.—100, Alderney St., Victoria. [9484

Chater-Zedel.

CHATER-ZEDEL, 2¾h.p., Ruthardt, Druids, B. and B., lamps, overhauled and enamelled like new; 15 gns.; call Sunday.—25, Cromwell Rd., Forest Gate. [9378

Chater-Lea-Jap.

4h.p. 1918 Special Chater-Lea-Jap coachbuilt combination, countershaft, and clutch, fully equipped, equal to new; £55.—82, Caledonian Rd. [9510

6h.p. Chater-Lea-Jap, 2-speed, clutch, chain drive, Simms-Bosch, Druids, good running order; a real good snip; first cash for £14.—819, Rochdale Rd., Manchester. [9557

CHATER-LEA-J.A.P. (genuine), Bramble C.B. sidecar, countershaft 3 speeds, excellent condition, fully equipped, guaranteed; £42, near offer.—Wall, 104, Lansdowne Rd., Dalston, London. [9539

FOR Sale, 4h.p. Jap-Chater-Lea, B. and B., Bosch waterproof mag., Bowden, 2-speed, kick start, in good condition, new back tyre and belt; £30.—E. Tickner, St. George's Cottage, The Tilt, Cobham, Surrey. [9520

Chater-Lea-Minerva.

CHATER-LEA-MINERVA, 5h.p. twin racer, 15 gns.; sidecar, 55/-; appointment.—Miss May, 66, Greyhound Lane, Streatham, S.W. 16. [9496

Clyde.

CLYDE, 2¾h.p., low, mag., mechanical valves, B. and B., Brooks, good tyres; £6/10; no reasonable offer refused.—19, Wyndham Rd., Upton Park. [9400

Clyno.

CLYNO 1912 6h.p. Combination; £35/10.—Motor Exchange, Horton St., Halifax. [9446

CLYNO 1914 2-stroke, 2-speed, little used; great bargain; accessories; £26/10.—Taylor, 1, Gorringe Terrace, Tooting Junction, S.W. [9565

MOTOR CYCLES FOR SALE.

Clyno.

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0894

CLYNO, 5-6h.p., 1914, and sidecar, thoroughly overhauled; £65; and others; extended payments arranged.—Service Co., 292, High Holborn, London. [X7740

Connaught.

CONNAUGHT, 1915, 2-speed, all accessories; £35; extended payments arranged.—Service Co., 292, High Holborn, London. [X7741

CONNAUGHT 2-stroke, late 1915, perfect order, good tyres and condition, all accessories; bargain to clear, £16; close offer considered; exchange.—79, Magdalen Rd., Wandsworth Common, London, S.W. [9549

BIRMINGHAM Agent, P. J. Evans, John Bright St.—1917 models of the famous Connaught two-stroke, standard 2¾-3h.p. models, either solo or with sidecar; miniature models, single or 2-speed countershaft gear; prices from 27 gns. [X7817

Coventry Eagle.

COVENTRY Eagles, 2½h.p., single-speed, £37; 2-speed and free engine, £44/2; in stock for immediate delivery; easy purchase terms if desired.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [9588

Dot.

2¾h.p. Dot-Jap Lightweight (new, 2 speeds, chain-cum-belt drive; genuine bargain, £28/10.—Lowe, Stanley St., Fairfield, Manchester. [9478

Douglas.

1913 T.T. 2¾h.p. Douglas, 2-speed, tyres as new; 28 gns.—Railway Garage, Staines. [9603

DOUGLAS Motor Cycle, 2¾h.p., 1916, only run 1,000 miles; £45.—Goodwyn, Bovey Tracey. [9511

1913 Model N. Douglas, first-class order; £30, or near offer.—Grey's Garage, Guildford. [9275

DOUGLAS, 1915, 4h.p., 2-speed gear, equal to new; £45.—64, Tilton Rd., Small Heath, Birmingham. [X7660

DOUGLAS, 1911, overhauled, splendid order; genuine bargain, £18.—16, Thomas St., Loughborough. [X7823

1916 Douglas, in fine order and condition, complete, lamps, etc.; £45.—Cross, Jeweller, Rotherham. [X7790

1914 (late) Model U Douglas, most carefully kept, exceptional order; £38.—Railway Garage, Staines. [9604

DOUGLAS, 1914, 2¾h.p., T.T. model, with accessories; £42/10.—Motor Exchange, Horton St., Halifax. [9447

DOUGLAS, 2¾h.p., 1916, T.T., 3 speeds, under 800 miles; £53.—Perkin, Cowlersley, Milnsbridge, Huddersfield. [X7773

1914 T.T. Douglas, 2¾h.p., 2-speed, good running order; £30.—The Premier Motor Co., Aston Rd., Birmingham. [9415

DOUGLAS, 1915, 2¾h.p., 2-speed, Colonial model, lamps, horn, speedometer, etc., in good condition; £43.—Below.

DOUGLAS, 1915 (late), 2¾h.p., 2-speed, T.T. bars, lamps, etc., fine condition; £47.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0481

DOUGLAS, 1914½, 2¾h.p., 2 speeds, clutch, kick starter, accessories; £35, lowest.—124, Walton Rd., Hampton Court. [X7832

DOUGLAS, 2¾h.p., 2-speed, kick starter, done 1,000 miles, electric lighting; £36.—Carlton Hotel, Noel St., Nottingham. [X7822

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Yeovil. Tel.: 50. [5855

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

DOUGLAS, 1915, Colonial Model, 3-speed, little used, condition like new; £50.—Withers, 60, Orchard St., Weston-super-Mare. [X7795

DOUGLAS Specialists.—Gibb, Gough, London Rd., Gloucester. Gibb, the International Douglas rider, winner of numerous cups and gold medals. [2218

DOUGLAS, 1914, 2-speed, free engine, kick starter, just overhauled by makers, accessories, tools; £40.—O'Neill, 2, The Retreat, Mortlake, Surrey. [9405

DOUGLAS, 1914, 2¾h.p., 2 speeds, new cylinders fitted last month, excellent tyres and condition; £36.—Burgess, Bilston St., Wolverhampton. [X7752

DOUGLAS, 1915, 2¾h.p., thoroughly overhauled and enamelled, as new; £46/10; extended payments arranged.—Service Co., 292, High Holborn, London. [X7742

DOUGLAS, August, 1915, Model V, 2-speed, all accessories, perfect order, property of deceased officer; £48.—Wilkinson, Heathside, Milford, Surrey. [9513

DOUGLAS, 1912, 2 speeds, lamps, generator, speedometer, had very little wear, grand running order; £24; appointment.—Ball, 1, Lower Charles St., Clerkenwell. [9401

DOUGLAS, 1916, 2¾h.p. Model U, 3-speed, kick start, Lucas lamps, horn, etc., only done 230 miles, absolutely unscratched; £54.—Abergele Motor Co., Abergele. [X7530

LAMB for 1917 Models

ACTUALLY IN STOCK.

8	h.p. **ENFIELD** Combination	£96 12
4½	h.p. **B.S.A.**, belt-cum-chain	£64 0
2½	h.p. **ENFIELD**, 2-sp., 2-stroke	£44 2
3	h.p. **ENFIELD**, 2-sp., & Canoelet S/car	£68 3
6	h.p. **ENFIELD** Standard Combination (2-seater £3 extra).	£94 10
7-9h.p.	**HARLEY - DAVIDSON** Standard Combination	£117 10
7-9h.p.	**HARLEY - DAVIDSON**, 1917, elec. Combination	£126 10
2½	h.p. **LEVIS** Model E, 2-sp., Enfield gear, rustless rims	£47 10
2½	h.p. **LEVIS** Popular	£32 0
3½	h.p. **ARIEL**, 2-sp., solo, kick-start	£65 10
2¾	h.p. **CALTHORPE-J.A.P.**, 2-sp. (2 models in stock)	£39 16
2½	h.p. **NEW HUDSON**, Model C, 2-speed	£38 0
7-9h.p.	**HARLEY - DAVIDSON**, 1916, and Sidecar	£102 9
2½	h.p. **ROYAL RUBY**, single-speed	£47 5
2¾	h.p. **ROYAL RUBY**, 2-speed	£40 0
2¾	h.p. **ROYAL RUBY**, 2-sp., J.A.P. (7 models in stock.)	£46 0
6	h.p. **ENFIELD** Tradesman's Outfit, slightly soiled	£90 0

SECOND-HANDS.

ENFIELD 1916 Commercial Box Carrier		£12 12
2½	h.p. **T.O.C.**, 1916, 2-sp., original tyres still on, spare tank	£2S 0
2½	h.p. **ALLDAYS ALLON**, 2-sp., clutch, all accessories	£36 10
2½	h.p. **COVENTRY-EAGLE**, 2-sp., 2-str., special price	£39 10
2½	h.p. **JUNO-VILLIERS**, 1916, all accessories, mileage about 100	£33 10
4½	h.p. **JAMES**, 1915, 3-speed, kick-start, lamps, horn	£57 10
2½	h.p. **ALLDAYS ALLON**, 1915, s.-speed, and accessories	£27 10
1	h.p. **AUTO-WHEEL**, B.S.A. model	£12 12
1	h.p. **AUTO-WHEEL**, Standard model.	£7 10
2¾	h.p. **CALTHORPE-J.A.P.**, 1915, 2-sp., and accessories	£27 10
2½	h.p. **LLOYD-VILLIERS**, 1916, s-speed, only shop-soiled, lamp, horn	£31 0
2½	h.p. **O.K. JUNIOR**, 1916, 2-sp., only shop-soiled, 2 lamps, horn	£28 10
4	h.p. **TRIUMPH**, 1914, 3-sp., lamp, horn, speedometer	£42 10
2¾	h.p. **NEW HUDSON**, 1912, 3-sp. J.A.P., lamps, horn	£16 10
3½	h.p. **ROVER**, 1913, Philipson pulley, 2 lamps, horn, very fast	£3S 10
2¾	h.p. **DOUGLAS**, 1914, 2-sp., T.T. bars	£39 10
4	h.p. **TRIUMPH**, 1910, 2-sp., N.S.U., new Dunlop tyres, P. & H. lamp, horn, speedometer	£22 10
6	h.p. **ENFIELD** 1916 Combination, all accessories	£8S 0
1913	2½ h.p. **DOUGLAS**, 2-speed	£32 10
1912	4 h.p. **BRADBURY**, 2-sp., and coach Sidecar, in need of slight repair	£22 10

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EXCHANGES.—Up-to-date machines accepted in part exchange.

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PUSH CYCLE DEPT.—We have always 100 to 150 in stock, including Raleigh, Rover, Enfield, B.S.A., New Hudson, Humber, etc., from £6 10s. to 14 guineas. If you are not using the motor, why not one of these? Carriage paid.

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Thursdays, 1 o'clock.

MOTOR CYCLES FOR SALE.

Douglas.

WAR Office Douglas, 2¾h.p., 2-speed, road soiled only, really brand new, mechanically perfect, guaranteed; £53.—Robinson's Garage, Green St., Cambridge. [9535

DOUGLAS, 1913 Model, 2¾h.p. T.T., 2 speeds, fine condition, practically new tyres, beautifully kept machine; any trial; £30.—Harry Pick, Farm Hill, Waltham Abbey. [9505

1914 Douglas, 2¾h.p., 2 speeds, and kick starter, engine in excellent running order, nearly new Dunlop tyres and belt; £35.—Benfield, Builder, Waterinhury, Kent. [9516

1915 2¾h.p. Douglas, 2-speed, semi T.T. bars, 2 Lucas lamp sets, Watford speedometer, horn, etc., in perfect mechanical order; £50.—Robinson's Garage, Green St., Cambridge. [9536

1914 Douglas, 2¾h.p., T.T., Amac carburetter, lamps, horn, tools, tyres and belt, as new; £35, or near offer.—Cambridge Garage, Frances St., Woolwich. 'Phone: 108 Woolwich. [9497

DOUGLAS (1914), 2¾h.p. Model U, 2-speed gear, footboards, lamp, horn, speedometer, run under 90 miles, belonged deceased officer who purchased July, 1914; £42/10.—Neill, 93, High St., Arbroath. [X7391

DOUGLAS, 2¾h.p., brand new, latest models, including W, U, and V; immediate delivery against official permits; special facilities doctors, farmers, and national workers.—Full particulars, Robinson's Garage, Green St., Cambridge. [9534

GREATEST Bargain ever offered.—Motor cycle, 1915, 3 speeds, 2¾h.p., W.D. Douglas, very little used, condition, appearance, as new, lamps, etc., all on, exceedingly fast and reliable machine; any trial; 40 gns.—Pick, 6, Monkswood Av., Walthem Abbey. [9504

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012

EDMUND, 3½-4h.p. M.A.G., free engine, 2-speed gear, chain drive, spring frame, accessories, very fast, perfect condition; £40.—Millar and Co., 113, High Rd., Palmer's Green, N. [X7666

EDMUNDS, spring frame, 2½h.p. J.A.P. engine, Royal Enfield 2-speed gear, semi T.T. bars, double tank, a fine machine for present day roads; £50/8; easy purchase terms if desired.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [9592

Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2¼h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Enfields, 8h.p., 6h.p., and 2-stroke in stock. [9578

ENFIELD 6h.p. Solo, very little used, in perfect order; £50.—Finch, Church St., Twickenham. [9382

1915 6h.p. Enfield Combination, as new, under 2,000, accessories; £66.—Morris, 43, Tanner St., Hyde. [X7727

1913 2¾h.p. Enfield Twin, 2-speed, chain drive, good order; £18.—Tompkins, Bozeat, Wellingborough. [X7782

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock for immediate delivery.—See below.

1917 6h.p. Enfield Coachbuilt Combination, with apron and mat, 2 speeds, clutch and starter, 90 gns.; extra for hood end screen, £4/19.—Below.

1917 3h.p. Enfield, solo or sidecar mount, 2 speeds, clutch, and kick starter; 55 gns.; sidecars from 7 gns.—Below.

1917 Enfield Two-stroke, 2¼h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright St., Birmingham. [X7818

ENFIELD 6h.p. Combination, coach, powerful, fast, splendid condition; must sell; 40 gns., bargain.—804, Seven Sisters Rd., Tottenham. [9572

ENFIELD Combination, 1914½, splendid condition, mechanically perfect; expert examination; 55 gns.—Read, 26, Cranbury Rd., Eastleigh. [9559

1916 (October) 6h.p. Enfield Combination, mileage 700, condition excellent, horn, lamps, 2 gallons oil, spares.—Rev. Hookham, Barnstaple. [X7669

1913-14 Enfield Combination, coach sidecar, £49/10; 1912 Enfield combination, cane sidecar, £39/10.—Collier's Motories, Deal St., Halifax. [9448

ENFIELD Combination, 6h.p., equal to new, lamps and horn; any expert examination; any trial; £75, no offers.—Langdon, High St., Exmouth. [X7797

ENFIELD, 2-stroke, 1917 model, 2-speed, only used 30 miles, perfect, and would pass for new; £39/10.—Alexander's, 115, Lothian Rd., Edinburgh. [9370

ENFIELD, 1914, 6h.p., coach sidecar, excellent condition, lamps, extra tyre, speedometer, mileage under 8,000; £60.—R., 21, Sussex Place, S.W. [9387

1915 Enfield, 3h.p. twin, in perfect order, 2-speed, kick starter, fully equipped, Palmer cord tyres; owner gone to Salonika; £40.—Grimston, Barrowfield, St. Albans. [X7694

MOTOR CYCLES FOR SALE.

Enfield.

ENFIELD Combination (late 1916), 6h.p., 2-speed, large F.R.S. lamp, horn, wind screen, hood, special tyres, absolutely as new, shop-soiled only; bargain, £86. —Below.

ENFIELD, 1916, 3h.p., 2-speed, lamps, horn, speedometer, etc., with Cancelet Minor sidecar, little used; £59.—Below.

ENFIELD, 1916, 3h.p., 2-speed, lamps, horn, speedometer, etc.; £44.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0552

3h.p. Enfield Coachbuilt Combination, perfect; expert examination invited; lamps, speedometer, spares, including petrol; £45, offers; leaving country.—Condon, Cove Rd., Weymouth. [9393

ENFIELD, 1914, 3h.p., thoroughly overhauled, £39/10; 1916-17, 3h.p., new, immediate delivery, 5 gns.; extended payments arranged.—Service Co., 292, High Holborn, London. [X7743

1916 Royal Enfield and Sidecar, new June, perfect condition, all lamps, special car generator for head light, horn, pump, mat, apron, etc., well kept; £75.—Simpson, 78, Gayton Rd., Harrow. [9397

ENFIELD Combination, 1916, completely equipped, only run a few hundred miles, and equal to new in every respect; guaranteed, and a bargain; 70 gns.—Longman Bros., King St., Acton, W. 3. 'Phone: 1578 Chiswick. [9528

ENFIELD, 6h.p., 2-speed, 1913 picked engine, formerly maker's own, 1914-15 coachbuilt Enfield sidecar, accessories, tyres perfect, little used, overhauled, smart, absolutely sound; trial; nearest £45.—4, Forest Hill Rd., Honor Oak, S.E. 22. [9541

1916 3h.p. Enfield Twin, 2-speed, kick start model, Lucas horn, machine new August, run under 500 miles, tyres very little worn and uncut, enamel slightly scratched, but otherwise everything as received from makers; £42; will give 12 gallons petrol with machine. —Adams, Bargrennan, Newton Stewart, Scotland. [X7764

ENFIELDS.—3h.p. combinations (2-seater £3 extra), £96/12, 6h.p. £94/10, 2¼h.p. 2-speed 2-stroke '44/2, 3h.p. 2-speed £57/15; also slightly shop-soiled 1917 8h.p. combination, £90; and 1916 (late) 6h.p., with Lucas accessories, speedometer, £85; extended payments by arrangement.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [9423

Excelsior.

1915 Excelsior Combination, 4½h.p., 3-speed, and clutch, in good running order, £40, or near offer; also 1916 2¼h.p. 2-stroke Excelsior, £20, or near; owner joined up.—J. Mitchell, 14, High St., Rusthall, Kent. [9357

BRAND New Latest Type 7h.p. 3-speed American Excelsior, complete with Montgomery coachbuilt sidecar, enamelled to match; £90; the fastest sidecar machine on the road; list free; liberal exchanges.—To be obtained only from the Premier Motor Co., Aston Rd., Birmingham. [9414

F.N.

F.N., 4-cyl., 2 speeds, clutch, speedometer, lamps, with aluminium sidecar, in splendid condition, very smart; £40.—Alderman, 309, Kilburn Lane, London, W. [9489

Grandex.

RIDER TROWARD'S, 78, High St., Hampstead.—New 1917 Grandex-Villiers, 2-speed, 29 gns.; new 1917 Grandex-Precision, T.T., 4h.p., 29 gns. [9438

Harley-Davidson

HARLEY-DAVIDSON Combination, new, in stock.—Pickering, Mardol, Shrewsbury. [X6776

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Harley-Davidsons, delivery from stock. [9577

HARLEY-DAVIDSON, 1915, appearance exactly as new, mileage 600; £58.—Castadot, 5, Napoleon Rd., Twickenham. [9515

1915 Harley-Davidson, with Henderson sidecar, only run week-ends; bargain at £65.—Stacey, 12, Ecclesall Rd., Sheffield. [9583

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802

LATE 1915 Harley-Davidson Combination fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea [0861

HARLEY-DAVIDSON, 7-9h.p., with 2-seater sidecar to match, little used, perfect condition; sacrifice £65 for cash.—Weed, The Grange, Empingham, Stamford. [9366

HARLEY-DAVIDSON 1915½ 7-9h.p. Combination, 3-speed, first-class condition; £60, or exchange lower power.—Williams, 28, Bushey Rd., Harlington, Middlesex. [9494

HARLEY-DAVIDSON, 7-9h.p., electrically equipped, practically brand new, fully equipped, speedometer, etc., done 900; cost £130, accept £75.—20, Whitley St., Reading. [9598

HARLEY-DAVIDSON.—New 1917 models in stock, 7-9h.p., 3-speed model 17F, £93; also one new 1916 Model 16F, £84/15; sidecars to match; cash, exchange, or extended terms quoted.—Below.

HARLEY-DAVIDSON, 1916, 7-9h.p., 3-speed, electric Model 16J, with Harley sidecar, as new; £86. —Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0551

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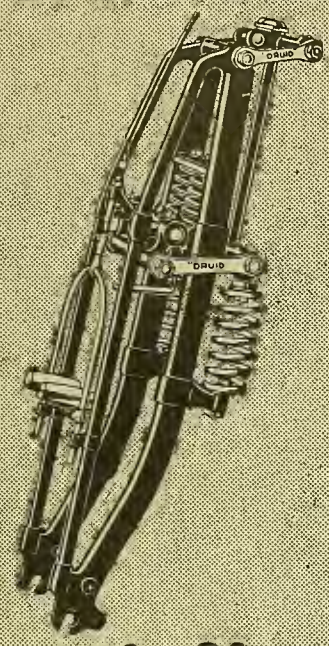

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Harley-Davidson.

HARLEY-DAVIDSONS Actually in Stock, £117/10 electric combination £126/10; exchanges, extended payments.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [9424

HARLEY-DAVIDSON Combination, new November, 1915, 7-9h.p., 3 speeds, dynamo lighting, complete accessories, practically new; any trial run; 3,000 miles; £70; consider cheaper machine and cash.—17, Calverley Rd., Tunbridge Wells. [9507

1915 Model 11J 7-9h.p. 3-speed Harley-Davidson, dynamo lighting outfit, special Gloria coachbuilt sidecar, combination overhauled, and appearance as new; £75.—The Premier Motor Co., Aston Rd., Birmingham. [9416

HARLEY-DAVIDSONS.—Immediate delivery; new magneto models, £84/15; several second-hand 1915 and 1916 combinations from £65; exchanges arranged. —Colmore Depot, 31, Renshaw St., Liverpool, and 211, Deansgate, Manchester. [0885

BRAND New Model 11F 7-9h.p. 3-speed Harley-Davidson, with Montgomery sidecar, £90; brand new Model 11J, dynamo lighting outfit, with Gloria sidecar, £100; the last two machines at this price.—The Premier Motor Co., Aston Rd., Birmingham. [9417

Humber.

1911 3½h.p. Humber; £15/10.—Motor Exchange, Horton St., Halifax. [9456

HUMBER Flat Twin Motor Cycles immediate; from Colmore Depot, Birmingham [0882

HUMBER Lightweight, 1914, splendid machine, little used; £15.—16, Thomas St., Loughborough. [X7824

HUMBER, 1917, latest models, 3½h.p. and 6h.p. horizontal twins, actually in stock.—Moss, Wem. [X7810

1914 3½h.p. 3-speed Humber, lamp, etc.; £35, cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea [0863

HUMBER, 3½h.p., low, fast, Bosch mag., nearly new Dunlop; bargain, £16, or near offer.—12, Roslin Rd., South Acton, W. [X7749

HUMBER, 4h.p., 2-speed, coachbuilt sidecar, speedometer, mechanical horn, lamps, accessories; £30. —18, Lewis Rd., Welling, Kent. [9469

1917 Humber Flat Twin, 3-speed, and sidecar, not done 100 miles; £75.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9470

1913 2¾h.p. Twin T.T. Humber, new Druids, thoroughly overhauled, in perfect condition; £20, or offers.—Judkins, Victoria St., Ripley, Derby. [X7827

RIDER TROWARD'S, 78, High St., Hampstead.—Humber, 3½h.p., T.T., 1912, new piston, cylinder, 14 gns.; 1913 2h.p. 3-speed Humber, 15 gns. [9442

HUMBER, 1915, 6h.p. flat twin, water-cooled, 3 speeds, clutch, starter, with Millford coachbuilt sidecar, Lucas head and tail lamps, 2 generators, mechanical horn, perfect condition; £65.—Alexander's, 115, Lothian Rd., Edinburgh. [9363

Indian.

1914 Indian, 7-9h.p., road racer, not done 1,000 miles; £30.—Fowler, 110, Wilton Rd., Victoria. [9381

INDIAN, 7-9h.p., clutch, kick starter, condition as new, £35; sidecar to match, £7.—King, 73, Hill St., Peckham. [9350

1915 Indian, 5h.p., 3-speed, little used, Lucas lamp, horn, tools; £43.—Keable, 111, High St., Guildford, Surrey. [9490

INDIAN, 7-9h.p., 1916 clutch model, as new, tyres unscratched, perfect everywhere; £55 cash.—Luck, 22, Grange Rd., Ramsgate. [9406

INDIAN 7-9h.p. Combination, as good as new, electric dynamo lighting and starter; £75; must be sold.—31, Bushey Park Gardens, Teddington. [9517

INDIAN, 1916, 5h.p., 3-speed, T.T. bars, clutch, kick starter, very little used, and good as new; £58.—Alexander's, 115, Lothian Rd., Edinburgh. [9369

7-9h.p. 1914 Indian and Sidecar De Luxe, 2-speed, free engine, kick starter, electric lighting set, electric horn, good condition; £50.—Redmore, High St., Horncastle. [9491

INDIAN, 1916, 5h.p., coachbuilt sidecar, 3 speeds, clutch, and kick starter, Lucas accessories; £65; solo model, hardly soiled, 60 gns.—P. J. Evans, John Bright St., Birmingham. [X7820

RIDER TROWARD and Co., 78, High St., Hampstead.—1911 Indian, 5h.p., splendid order, 19 gns.; 1914 clutch model, 7-9h.p., 36 gns.; 1915 5h.p., 3-speed, kick starter, 39 gns.; with Cancelet sporting sidecar, 40 gns. [9434

INDIAN 1916 Powerplus, 7h.p., 3-speed, clutch, kick starter, Model G, with Indian coachbuilt sidecar, lamp and generator, only used 200 miles, and in absolutely new condition; £90. Wire to secure.—Alexander's, 115, Lothian Rd., Edinburgh. [9372

James.

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803

JAMES, 4h.p., 1916, indistinguishable from new, in thorough order, little used; £50; extended payments arranged.—Service Co., 292, High Holborn, London. [X7744

MOTOR CYCLES FOR SALE.

James.

JAMES 2-strokes, 1917 models, for immediate delivery.—Colmore Depot, 211, Deansgate, Manchester. [0888

1916 James Combination, 3-speed countershaft, good as new; only £70.—Parker and Son, St. Ives, Hunts. [9552

JAMES, 1913, 86×96, countershaft gear, end coach sidecar; £39/10.—Motor Exchange, Horton St., Halifax. [9449

JAMES, 2-stroke, 1916, 2-speed, lamps and horn, splendid condition; price £30; seen any time by appointment.—1, Dallin Rd., Plumstead. [9251

JAMES 1916 No. 6 Combination, 4¼h.p., 3-speed countershaft geer; exchange higher power, cash adjustment, or sell.—Box 786, c/o *The Motor Cycle*. [X7750

JAMES, 2¾h.p., late 1916, 2-stroke, and 2-speed, as new, not done 200 miles, accessories; 40 gns., or near offer; must sell; any trial.—Geo. Doman, Whitehills, Fordon, Hants. [X7668

JAMES, 1917 models, for immediate delivery from stock. Big "Four" combinations, with and without Lucas dynamo lighting set; 3½h.p. twin, and two-stroke models.—P. J. Evans, John Bright St., Birmingham. [X7813

J.A.P.

2 3h.p. 1916 J.A.P., complete power unit; £12, or offer.—Page, 78, Brownlow Rd., New Southgate, N.11. [9570

8h.p. Twin J.A.P., carburetter, Chater-Lea clutch, Bosch mag., silencer, little used; £22, or separate. —Bertram, Gorebridge, Scotland. [X7730

J.A.P., 2¾.h.p., in splendid condition throughout, property of officer in France, who must sell; sacrifice £12. Rowe, 140, Church Rd., Hove. [9464

Lea-Francis.

LEA-FRANCIS, 1913, 2-speed, clutch, kick starter, perfect; best offer over £35.—Box L3,332, c/o *The Motor Cycle*. [9411

Levis.

LEVIS, latest, brand new, single and 2-speed models in stock.—Moss, Wem. [X7811

LEVIS Popular, 1915; £18.—Darke, Waterloo House, London Rd., Sutton, Surrey. [9523

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804

LEVIS 2¼h.p. Popular; £32; in stock for immediate delivery; easy purchase terms if desired.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [9587

LEVIS Popular, 1916, runs well on substitute, not done 500 miles, all accessories; 25 gns.—A. C. Huskinson, 67, Crystal Palace Park Rd., Sydenham. [X7709

LEVIS, 2¾h.p, 1916, Enfield 2-speed gear, Roman rims, Senspray carburetter, horn, perfect condition throughout; £30.—Sussex Garage Co., Grand Parade, Brighton. [X7799

Lloyd.

LLOYD-VILLIERS, 2½h.p., 2-stroke, 1916, 2-speed countershaft model, perfect condition, complete with Lucas lamps and horn; £26.—Syd. Pearson, 66, St. Patrick's Rd., Coventry. [X7839

Martin.

MARTIN-J.A.P., 3½h.p., Bosch mag., N.S.U. gear, Mills-Fulford sidecar, splendid outfit; £28/10.—Barley, 64a, Highbury Grove, Highbury, N. [X7781

Matchless.

MATCHLESS Motor Cycles; no quicker delivery obtainable than from Colmore Depots. [0881

8B. Matchless Combination, mag., in perfect condition, lamp, etc., complete; £65, bargain.—Stacey, 12, Ecclesall Rd., Sheffield. [9579

MATCHLESS 8B Combination, 1914, M.A.G., 3-speed, all accessories and spares; no offer under £60.—Bertram, 115, West Side, Clapham Common, S.W. [9394

1915 Matchless 7h.p. Combination, lamps, horn, tools, etc., perfect condition; £75, or near offer. —Cambridge Garage, Frances St., Woolwich. 'Phone: 108 Woolwich. [9498

1914 Matchless, 7h.p. M.A.G. engine, Swan sidecar, lamps, horn, speedometer, tools, etc.; 65 gns.— Cambridge Garage, Frances St., Woolwich. 'Phone: 108 Woolwich. [9499

6h.p. Matchless 2-speed Combination, 20 gn. coachbuilt sidecar, spare tyre, tube, belt, and case, speedometer, etc., just thoroughly overhauled; £37, or nearest.—14, Chipley St., New Cross. [X7786

Motosacoche.

2 1h.p. 1913 Motosacoche, almost new, lamps, and 2 tools; sell at £15, or nearest offer.—Nice, Histon, Cambs. [X7710

1915 Motosacoche 3½h.p. Twin, De Lissa valves, 2-speed, T.T. bars, sidecar, lamps, horn, etc.; £35, or near offer.—Cambridge Garage, Frances St., Woolwich. 'Phone: 108 Woolwich. [9500

New Hudson.

1914 New Hudson, 3-speed, clutch, kick starter, good order; £30.—82, Caledonian Rd. [9509

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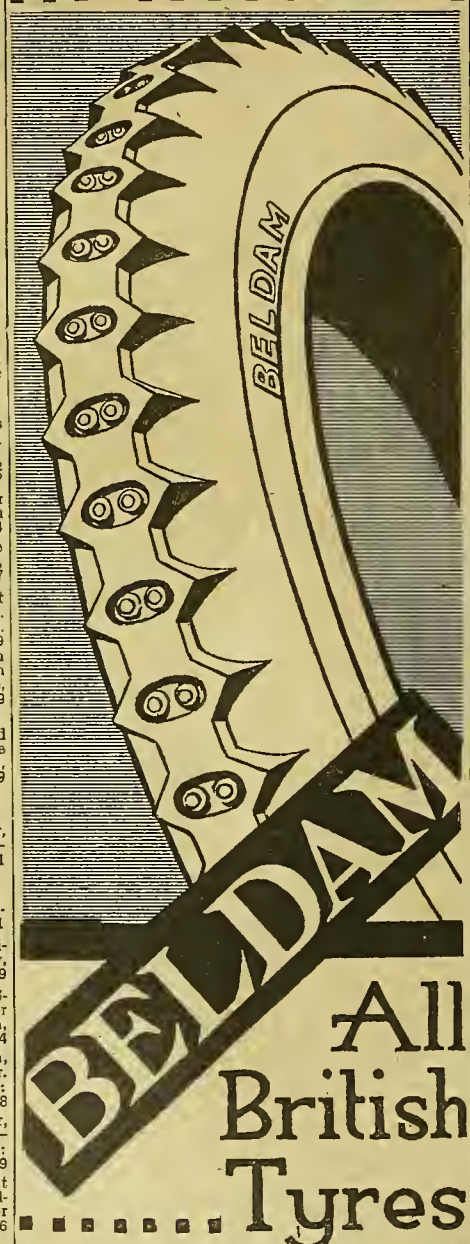

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Godbolds

MOTOR CYCLES FOR SALE.

New Hudson.

1916 New Hudson, 2-speed, 2-stroke, as new, complete, lamps, etc.; £32.—Stacey, 12, Ecclesall Rd., Sheffield. [9581

NEW Hudson Combination, 4h.p., countershaft 3-speed, kick starter, speedometer, 3 lamps, horn, drip feed, everything complete; £45.—Gillman, 66, Hunter Rd., Southsea. [X7757

1914 New Hudson, 4h.p., 3-speed, kick starter, and wicker sidecar, lamps, etc., in good condition, run fine on pure paraffin, petrol starting device; trial by appointment; price £35.—Holland, Rossett, near Wrexham. [X7802

New Imperial.

NEW Imperial-Jap, 2-speed, not done 1,000 miles; £25.—A. L. Pitts, Redditch. [X7836

NEW Imperial, 1917, 2½h.p., 3½h.p., 6h.p. models in stock.—Crow Bros., Guildford. [9212

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Imperial-Jap's, delivery from stock. [9576

COLMORE Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0805

1916 New Imperial-Jap, fitted speedometer; £37.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9147

NEW Imperial Lightweights, 1917 2-speed models from stock; 39 gns.; best value on the market. —Motories, 68, Horton St., Halifax. [9450

NEW Imperial-Jap, 1917 model, 2¾h.p., 2-speed, T.T. bars, only used one week; owner called up; 35 gns.; guaranteed as new.—Alexander's, 115, Lothian Rd., Edinburgh. [9373

NEW Imperial 1917 Models for immediate delivery; model 1, 39 gns., No. 2 46 gns.; several second-hand 1916 machines from £30.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0888

NEW Imperial-Jap, 2¾h.p., 1915 model, Bosch mag., semi T.T. bars, 2-speed countershaft gear and free engine, P. and H. lamp, toolbag, carrier, etc., splendid running order; £23.—George, Westerley, Clevedon. [X7721

NEW Imperial 1917 Models in stock; light tourist, 2 speeds, countershaft, 38 gns.; clutch and kick starter models, also ladies' models ready to drive away. P. J. Evans, Controlling District Agent, John Bright St., Birmingham. [X7816

NEW Imperials, with 2½h.p. J.A.P. engine, 2-speed £40/19, ditto with clutch and kick starter £48/6; in stock for immediate delivery; easy purchase terms if desired.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [9590

Norton.

NORTON, 3½h.p., T.T., 1916½, 2-speed, clutch, speedometer, P.H. lamps, Senspray, Sparton, 2,000; £55; with Philipson £49; see Exchanges.—Bramwell, 44, Marine Parade, Brighton. [9526

N.S.U.

N.S.U., 6h.p., 2-speed gear (little used), Bosch, B. and B., spring forks; £12/15.—5, Minerva Av., Dover. [9413

N.S.U., 5-6h.p., 1907-8, and sidecar, Bosch mag., 2-speed, engine overhauled, receipts shown, 2 new tyres.—428, Camden Rd., Holloway. After 5 p.m. [X7531

O.K.

1914 O.K., 2-speed, splendid order; £18 only.—Parker and Son, St. Ives, Hunts. [9556

O.K. Junior, 1917 models in stock, immediate delivery, M.A.G. and J.A.P. engines, 2-speed, kick start models; demonstrations arranged; weight 130 lbs., 130 m.p.g., and 45 m.p.h.; from 38 gns.—Meeten, O.K. Specialist, Dorking. [9341

P. and M.

1911 P. and M., in fine order, complete lamps, etc.; £23.—Cross, Effingham Sq., Rotherham. [X7791

P. and M., 1914, 3½h.p., 2-speed, free engine; £30, offers.—Bailey, 55, Effingham Rd., Lee, S.E. [9379

1915 3½h.p. P. and M., 2-speed, lamps, horn, Stewart speedometer, auxiliary petrol tank, coachbuilt sidecar with screen, mileage 2,500; 55 gns.—Anthony, 57, Ashbourne Rd., Liverpool. [X7697

P. and M. Combination, 1914, with genuine P. and M. coachbuilt sidecar, head and tail lamps, horn, etc., at the unrepeatable price of 40 gns., cash only.— Layton's Garage, Bicester, Oxon. [9596

1914 2-speed P. and M., acetylene head light, electric tail, speedometer, horn, tools, in perfect condition, tyres almost new; £45 cash.—Vaughan, St. Maur, Benhill Wood Rd., Sutton, Surrey. [X7716

Precision.

PRECISION, 4¼h.p., nearly new, Sturmey-Archer countershaft gear, 2½in. tyres; £35, lowest price.— Cond, 24, Southam Rd., Hall Green, Birmingham. [X7535

Pilot.

RIDER TROWARD'S, 78, High St., Hampstead.— 1914 Pilot, 4h.p., 3-speed; 24 gns. [9427

Premier.

PREMIER, 2¼h.p., 1915, 3-speed, as new, lamps, etc.; £28.—Digby, Mersea, Essex. [9408

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Premier.

PREMIER, 1912, 3½h.p., excellent condition throughout; 15 gns.—245, Hammersmith Rd., London, W. [9487

PREMIER, 1912, 3½h.p., 2 speeds; £21/10, or with sidecar £24/10.—Motor Exchange, Horton St., Halifax. [9451

1914 3½h.p. Premier, 2 speeds, coachbuilt sidecar; £45; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0823

PREMIER Lightweight, almost new condition; £20.—Cambridge Garage, Frances St., Woolwich. 'Phone: 108 Woolwich. [9502

PREMIER, 1913, 3½h.p., 3-speed, clutch, kick starter, coachbuilt sidecar, in good order; £35.—John England, Valley Mills, Newmill, Huddersfield. [9601

PREMIER, about 1912, 3½h.p., needs overhauling, with O.B. sidecar; what offers? seen any time between 9 and 6 p.m.—Grimston Tyres, Ltd., The Camp, St. Albans. [X7695

Puch.

RIDER TROWARD'S, 78, High St., Hampstead.—Puch, 1914, T.T., 3h.p., enclosed Bosch, long exhaust, fast machine; 14 gns. [9441

Quadrant.

RIDER TROWARD'S, 78, High St., Hampstead.—1913 Quadrant, 2-speed, clutch, 24 gns.; 1914 Quadrant, 3-speed, clutch, 29 gns.; good sidecar to fit either, 4 gns. [9437

Regina.

REGINA-PRECISION, 1914, 4h.p., 3-speed, re-enamelled; 25 gns.—Troward's, 78, High St., Hampstead. [9426

Revere.

1916 Revere, 2-speed, Lucas lamp, not done 500 miles; cost £41, sell at £31/10; like new.—Stacey, 12, Ecclesall Rd., Sheffield. [9580

Rex

REX, latest model twin, 2 speeds, coach combination; £49/10.—Motor Exchange, Horton St., Halifax. [9452

REX, 6h.p., mag., free engine, handle starting, rebored, bushed, new tyres, spring forks; £15.—Caudwell, 7, King St., Reading. [X7841

Rover.

1917 Rovers in stock.—Lambert's, Thetford. [9153

ROVER New 1917 Combination, solo and T.T. models in stock.—Moss, Wem. [X7812

COLMORE Depots, Birmingham and Manchester, for quickest delivery of Rover motor cycles. [0883

1914 Rover Combination, 3-speed, excellent condition; only £50, or offers.—Parker and Son, St. Ives, Hunts. [9553

GENUINE 1914 T.T. Rover, thoroughly overhauled, fully equipped; £26 gns.—Box L3,336, c/o *The Motor Cycle.* [9349

1914 Rover, 3½h.p., free engine, lamp, and generator; 28 gns.—Julian, 84, Broad St., Reading. Phone: 1024. [X7793

ROVER Combination, 1917 model, new, for immediate delivery; £89/9.—Colmore Depot, 211, Deansgate, Manchester. [0887

BIRMINGHAM Agent for Rovers, P. J. Evans, John Bright St.—1917 models in stock for immediate delivery.—See below.

1917 3½h.p. Rover Coachbuilt Combination, 3-speed countershaft gear, De Luxe sidecar; 90 gns.—See below.

1917 3½h.p. Rover, sporting model, racing or semi racing handle-bars; £57/10; extra for handcontrolled Philipson pulley, £4/10.—P. J. Evans, John Bright St., Birmingham. [X7814

ROVER, brand new, 1916 pattern, 3-speed countershaft, clutch, and kick starter, £66/10; 1917 model, £73/10; easy purchase terms if desired.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [9591

Royal Ruby.

1915 Royal Ruby, 2-stroke; £16/10.—Motor Exchange, Horton St., Halifax. [9454

1917 Royal Ruby, 2-stroke, 2-speed, in stock.—Pickering, Mardol, Shrewsbury. [X6777

1914 Royal Ruby, 2-stroke, magnificent little bike, runs well on substitute; £15.—251, Bentley Rd., Doncaster. [X7784

RIDER TROWARD'S, 78, High St., Hampstead.—1914 Royal Ruby, 3½h.p. twin overhead J.A.P., Carryers T.T. mount; 32 gns. [9430

ROYAL Ruby, 1917 model, 6h.p., delivery from stock; £72; extended payments arranged.—Service Co., 292, High Holborn, London. [X7745

ONE Only, brand new 1916 2¾h.p. Standard Model Royal Ruby, 2-stroke, slightly shop-soiled; £29 cash.—The Premier Motor Co., Aston Rd., Birmingham. [9419

1915 2¾h.p. Royal Ruby, 2-stroke, countershaft 2-speed, Druid forks, lamp, horn, and tail lamp, perfect condition; £28.—The Premier Motor Co., Aston Rd., Birmingham. [9418

Rudge.

RUDGE Multi Combination; bargain, £45.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9146

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RUDGE Multi, excellent condition, new back tyre and tube; only £25.—Parker and Son, St. Ives, Hunts. [9555

RUDGE, 3½h.p., 2 speeds, coach combination, good order, full equipment, spares; first £27.—Leech, 10, Carrington St., Barnsley. [X7712

RUDGE T.T. Model (1912), free engine, clutch, new cover, new belt; bargain, £18; exchanges offers.—Progress Cycle Works, Chapel End, Atherstone. [X7779

RUDGE Multi, Isle of Man T.T., 1915, lamps, horn, speedometer, in very good condition; £40.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0492

RUDGE Multi, 1915, 5-6h.p., and sidecar, speedometer, all lamps, total mileage 4,700, magnificent condition, and guaranteed; £40.—Longman Bros., King St., Acton. 'Phone: 1578 Chiswick. [9530

RUDGES.—1912 2-speed, 24 gns.; with coach sidecar 27 gns.; 1913 T.T. Multi, 1915 tank, mag., carburetter, mudguards, 28 gns.; with sidecar 32 gns.—Rider Troward and Co., 78, High St., Hampstead. [9433

Scott.

COLMORE Depots, Birmingham, and Manchester, for Scott motor cycles. [0806

1913 Scott and Myers Sidecar, in first-class running order throughout; £39.—F. Stebbings, Attleborough, Norfolk. [9550

1913 Scott, good condition, sporting sidecar, speedometer; what offers.—Dawson, The Homestead, Hayes End, Hayes, Middlesex. [9564

Singer.

RIDER TROWARD'S, 78, High St., Hampstead.—1913 Singer, 2½h.p., new Dunlops, overhauled, M.A.G. engine, perfect; 13 gns. [9429

SINGER Lightweight, 1912, not used since war, owner on service, wants exhaust lifter cable, enamelling unscratched; first £12 secures.—Box 782, c/o *The Motor Cycle.* [X7726

Sparkbrook.

SPARKBROOK, 2½h.p., 2-stroke, 2-speed; in stock for immediate delivery; £40; easy purchase terms if desired.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [9589

Sun.

COLMORE Depots, Birmingham and Manchester, for delivery from stock of all models of Sun motor cycles. [0807

SUN-J.A.P., 3-speed countershaft, 4h.p.; £63; extended payments arranged.—Service Co., 292, High Holborn, London. [X7748

1915 Sun-Villiers, 2-stroke, 2-speed, complete, in fine condition, £24; also single-speed at £18.—Stacey, 12, Ecclesall Rd., Sheffield. [9582

1916 Sun-Villiers, T.T. bars, footboards, drip feed, equipped lamps, horn, tools, good condition; £22/10.—Ginns, Carleton, Carlisle. [9344

SUN-V.T.S., 1916, 2-stroke, 2-speed countershaft, drip feed, only run few miles, better than new, tyres, plating, enamel, almost unmarked, perfect little machine; trial; £29/10, genuine bargain.—34, Forest Hill Rd., Honor Oak, S.E. 22. [9542

Sunbeam.

1916 Sunbeam, perfect, lamps, horn, etc.; £75.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9145

1915 3½h.p. Sunbeam, 3-speed, hand controlled clutch, 2 lamps, horn, etc., just overhauled; £58.—Robinson's Garage, Green St., Cambridge. [9537

1915 3½h.p. 3-speed Sunbeam Combination, fully equipped, excellent condition; £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0862

SUNBEAM Combination, 1914, 6h.p., 3-speed, lamps, horn, speedometer, wind screen, etc.; £70.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0480

1916 3½h.p. Sunbeam, Mead-Deakin sidecar, Miller lamps, speedometer, mechanical horn, watch, mirror, knee pads, leggings, accessories, perfect, equal new, done 2,039 miles only; 72 gns.; appointment.—Johnson, 137, Upper Hanover St., Sheffield. [9343

Torpedo.

RIDER TROWARD'S, 78, High St., Hampstead.—Torpedo-Precision, 1914, 4h.p., clutch; 22 gns. [9435

TORPEDO-PRECISION, 2¾h.p., 1914, 2-speed countershaft, engine rebushed throughout, complete with accessories; £18, no offers.—Ernest Webber, 11, Simpson St., Batterses, London. [9566

Triumph.

TRIUMPH Baby, 2-stroke, in good order; £29/10.—Motor Exchange, Horton St., Halifax. [9437

1914½ Triumph, 3-speed, as new; £42/10; see Exchange.—Crichton, Droylsden, Manchester. [9390

TRIUMPH, 3½h.p., drop frame, new tyres and tubes, splendid condition.—29, Wymond St., Putney. [9508

1914 Triumph, 3-speed, lamp and horn; 35 gns.—Julian, 84, Broad St., Reading. 'Phone: 1024. [X7794

TRIUMPH, 1912, 2-speed, handle start, new coach sidecar; £26, bargain.—29, St. Leonard's St., Bow. [9532

MOTOR CYCLES FOR SALE.

Triumph.

TRIUMPH, 1913, T.T., with Brampton gear, guaranteed first-rate order; £27/10.—A. L. Pitts, Redditch. [X7837

1914 Triumph Junior, 2-speed gear, good condition; 21 gns.—Julian, 84, Broad St., Reading. 'Phone: 1024. [X7792

TRIUMPH, 1911-12, free engine, 2-speed, good condition, £19/10; Quickfit sidecar, £3/5.—82, Balaam St., Plaistow. [9600

1914 3-speed Triumph, accessories, excellent condition; £32.—Southbury House, Mytchett Rd., Frimley, Surrey. [9524

TRIUMPH, 3½h.p., 3-speed, clutch, excellent condition throughout; 22 gns.—245, Hammersmith Rd., London, W. [9486

TRIUMPH, 1913, clutch, Philipson, and coach sidecar; £38.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9471

TRIUMPH, late 1914, 4h.p., 3-speed, Lucas lamp set, excellent condition; £40, or exchange Douglas.—Gayford, Esher. [9361

TRIUMPH 3-speed Combination, perfect; any trial; tyres new, Lucas set, and spares.—Pagett, 41, Coventry St., Kidderminster. [X7771

TRIUMPH, 1912, 3½h.p., fixed engine, just overhauled, good condition, lamps, and horn; £21.—Rev. England, The Hut, Epsom. [X7663

1911 Triumph, semi T.T., free engine, new piston, bushes, belt recently, tyres, enamel, plating good; £16; cash wanted.—87, Crown Lane, Bromley. [9521

TRIUMPH, 4h.p., 1914, S.A. gear, all accessories and spares, in excellent condition; £38; property of officer gone abroad.—Quinton, R.N. Hospital, Portland. [9352

1914 4h.p. Triumph, 3-speed, clutch, lamps, horn, speedometer, tyres and belt, as new.—Cambridge Garage, Frances St., Woolwich. 'Phone: 108 Woolwich. [9501

TRIUMPH 1910 and 1912 Models, in perfect condition, ready for the road; offers invited; extended payments arranged.—Service Co., 292, High Holborn, London. [X7746

1915 Triumph Junior, 2¼h.p., 2-speed, valveless lightweight, lamp, horn, and tail lamp, perfect condition; £35.—The Premier Motor Co., Aston Rd., Birmingham. [9420

1914 4h.p. 3-speed Triumph, Lucas lamp, not used, horn, and speedometer, everything as new, not run 800 miles, guaranteed perfect.—Bull, St. Giles' Sq., Northampton. [X7835

1914 Triumph, with lamp and horn, tyres and belt in good condition; only 35 gns.—Julians, 84, Broad St., Reading. Biggest light car and motor cycle dealer in the South. 'Phone: 1024. [9375

TRIUMPH, 3h.p., £7/10; 1909, £17/10; 1909, 2 speeds, and sidecar, £19/10; 1910, £19/10; 1911, £20; sidecar £3 extra; close cash offers considered.—Motor Exchange, Horton St., Halifax. [9455

RIDER TROWARD'S, 78, High St., Hampstead.—Triumphs 1908, 3-speed, 16 gns.; 1912, T.T. clutch, 22 gns.; 1913, T.T., re-enamelled; 1913, T.T. clutch; 1913, T.T., overhead, disc wheels; each 27 gns. [9436

TRIUMPH, 1913, special T.T., Philipson pulley, and lightweight Watsonian sidecar, fast and flexible, guaranteed complete with lamps, and any trial given; £28.—Longman Bros., King St., Acton, W. 3. 'Phone: 1578 Chiswick. [9529

TRIUMPH, lovely order, recently renovated, £5 new parts fitted, any trial, £16/10; Jones £6 speedometer, trip, and maximum hands, run 1,600 miles, 55/-; P. and H. large lamp set, as new, £1.—R.B., 2, Whitehorse Rd., West Croydon. [9519

TRIUMPH, 3½h.p., clutch, Sturmey-Archer 3-speed hub gear, and roomy sidecar, full set lamps, electric horn, celluloid screen, very complete tools, spare parts; reasonable price for quick sale.—Andrew, Westways, Milton Av., Gerrards Cross, Bucks. [9393

Victoria.

3½-4h.p. Victoria Combination, 1914, coachbuilt sidecar, 3-speed Sturmey-Archer gear, clutch, Bosch mag., lamp, horn, fine running order; £38; Scotland.—Box L3,333, c/o *The Motor Cycle*. [9473

Werner.

WERNER, 3½h.p., with all accessories, in running order; £6/10, or offer.—Nice, Histon, Cambs. [X7711

Williamson.

8h.p. Williamson and Sidecar, late 1913, splendid order, 2 speeds, free, lamps, etc.; sacrifice for £30 quick sale.—Pye, Oswell, Vicarage Lane, Stratford, E. [X7762

Win-Precision.

WIN-PRECISION, 4½h.p., and Paragon sidecar, 3 speeds, all accessories, perfect condition; £40; extended payments arranged.—Service Co., 292, High Holborn, London. [X7747

Wolf.

WOLF-J.A.P., 2¾h.p., 2-speed, kick start, hand clutch, Bosch, Druids, footboards, Avons, tank hardly scratched; 29 gns.—26, Wolverhampton Rd., Cannock. [X7785

MAKE SURE NOW OF YOUR MOTOR CYCLE

And a full Season's Motor Spirit to run it on, by taking advantage now of

ALEXANDERS'

TRIPLE DEAL.

By this arrangement you at once secure your choice of a Machine from the finest selection of High-grade Motor Cycles in the kingdom. You also guard against Petrol shortage by securing at once a full supply of the best and most perfect Motor Spirit; and, should you at any time require to use an inferior substitute, the **EUK** starter fitted to your Machine equips it to start up, no matter what fuel you may be running on.

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YOU CHOOSE YOUR MOTOR CYCLE

From our up-to-date Stock of Latest Models of

ENFIELD, B.S.A., CLYNO, ZENITH, INDIAN, BRITISH EXCELSIOR, LEVIS, ALLON, CALTHORPE, SPARKBROOK, NEW IMPERIAL, DIAMOND, Etc.

Many models to suit all. Send for our big Lists of New and Second-hand Models, and make your choice.

YOU SECURE AT ONCE YOUR SEASON'S RUNNING FUEL,

The World's Best.

THE BEATSOL SPECIAL MOTOR SPIRIT.

Free from any duty or restriction, a Motor Spirit of high efficiency, which will run your Motor Cycle as smoothly and perfectly as the finest Petrol; requires no mixing, no alteration to carburetter, no vaporiser, and gives exactly the same results as Petrol. Regular price hitherto, in 42 gallon barrels, 2/9 per gallon; now **reduced to 2/6 per gallon, and sold only to purchasers of Machines from us.**

The EUK EASY STARTER

Our invention! In great and growing demand. Banishes all starting difficulties with petrol substitutes.

Price 21/-. Immediate delivery.

Choose your Machine now, fitted with the **EUK**, and, if you are not satisfied with the Spirit you have been using, make sure by getting a Barrel of **BEATSOL SPECIAL**, thus completing the Triple Deal—a deal backed by our guarantee and business reputation, which ensures your absolute satisfaction.

ALEXANDERS'

113-115, LOTHIAN ROAD, EDINBURGH.
272-274, GT. WESTERN RD., GLASGOW.

MOTOR CYCLES FOR SALE.

Zenith.

RIDER TROWARD'S, 78, High St., Hampstead.—1912 3½h.p. Zenith, engine and gears sound, wants slight attention; 12 gns. [9428

ZENITHS, new models in stock: 6h.p. clutch Model F, £84/6; Model H, 8h.p., £85/9; cash, exchange, or deferred terms quoted.—Below.

ZENITH, 1914, 3½h.p., overhead valve, 90×77½, winner at Brooklands, new tyres, T.T. bars, lamps, horn, etc.; £42.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0491

ZENITHS.—Immediate delivery latest 1917 models; 3½h.p. twin J.A.P., with Gradua gear, clutch, kick starter.—P. J. Evans, John Bright St., Birmingham. [X7821

R.F.C. Officer, forbidden by doctor to ride, has for disposal a November (1916) 90 bore T.T. 8-10h.p. Zenith; this machine has not done 500 miles, is fitted with a sporting 4in. exhaust, well dropped and taped bars, F.R.S. magneto lighting set, 1⅛in. Dunlop, ditto spare, and is in first-rate order; may be seen in London; price for quick sale £68 cash.—Box L3,319, c/o *The Motor Cycle*. [9377

Miscellaneous.

BOOTHS Motories, Portland Place, Halifax.—Detailed list of motor cycle bargains free.

HARLEY-DAVIDSON, 7-9h.p., fitted with £22/10 coupe Fitsu sidecar; £69/10.—Booths Motories.

NEW Imperial-Jap, 2½h.p., 1915, 2-speed countershaft gear; £25/15.—Booths Motories, Halifax.

EXCELSIOR, 2¼h.p., 2-stroke, 1916, only run about 500 miles; £24/15.—Booths Motories.

JAMES, 4¼h.p., 1912, 2-speed, chain drive, coach sidecar; £28/15.—Booths Motories, Halifax.

HUMBER, 3½h.p., 1913, 2-speed, handle starting, enamel splendid condition; £28/15.—Booths Motories.

TWIN Premier, 8h.p., 1914, 2-speed countershaft; £18/18 coach sidecar; £49/15.—Booths Motories.

TRIUMPH, 1910, free engine, T.T. bars, good tyres; £18/10.—Booths Motories, Halifax.

B.S.A., 1911, 3½h.p., Grade variable gear, nice condition; £22/10.—Booths Motories, Halifax.

DOUGLAS, 1913, 2-speed, T.T. bars; £30.—Booths Motories, Portland Place, Halifax.

B.S.A., 4½h.p., 1915, 3-speed, ran 1,200 miles; £55.—Booths Motories, Halifax.

HARLEY-DAVIDSON, 9h.p., brand new 11J, electrically equipped; £84.—Booths Motories.

PREMIER Lightweight, 1912 model, 2¾h.p., 3-speed; £16/15.—Booths Motories, Halifax.

MINERVA, 3½h.p., new weatherproof mag., very good tyres; £9/10.—Booths Motories, Halifax.

L.M.C., 3½h.p., 1912, 2-speed, with sidecar and lamps; £27/15.—Booths Motories, Halifax.

MINERVA, 3h.p., mag., Saxon forks, variable gear; £7/15.—Booths Motories, Halifax.

DOUGLAS, 1912, 2-speed, 2¾h.p., nice condition; £20.—Booth Motories, Halifax. [9543

FARRAR'S.—1916 4¼h.p. B.S.A., Cowey, lamps, mechanical horn, Coronet £12/12 sidecar, mileage under 2,000; sacrifice £62.

FARRAR'S.—Lady's Douglas, 2-speed model, fine goer, very good tyres; £25.

FARRAR'S.—1914 6h.p. Bradbury coachbuilt combination, countershaft 3-speed gear, kick starter, speedometer, lamps, etc.; sacrifice £63.

FARRAR'S.—5h.p. twin Rex, variable pulley, wicker sidecar, Bosch mag., B. and B. carburetter, fine goer; sacrifice £14/14.

FARRAR'S.—1916 8h.p. Chater-Lea and Millford sidecar, countershaft 3 speeds, kick starter, chain drive, beautifully fitted up; £88.

FARRAR'S.—5-6h.p. big single English Excelsior, 3 speeds, countershaft gear, kick starter, perfectly new, unused; £72.

FARRAR'S.—Brand new 2¾h.p. Omega, J.A.P. engine, Albion countershaft gear, 2 speeds; £39/10.—Farrar's Motories, Hopwood Lane, Halifax. [8220

1913 Enfield Combination, £40; 1913 Rudge Multi combination, £30; speedometer, 25/-; Triumph carburetter, 5/-.—George Smith, 5, Grange Av., Auckland Park, Bishop Auckland. [X7718

1913 Rudge, with N.S.U. 2-speed, perfect, £22; Ivy 2-stroke, almost new, £24; 1912 New Hudson, 3-speed, £20; 1912 Douglas, £14, or offer; 1914 Lincoln-Elk, 4¼h.p., 2 speeds, and sidecar, £30.—Howley, Devizes. [9367

1916 Rudge Multi, I.O.M. Model, sloping tank, 3½ h.p., new tyres, grand condition, very fast, well equipped, £44; also 1916 sporting Diamond, 2¾h.p., do 55, 2-speed gear, fine order and condition, £40; giving up riding.—R. Braid, Gwynfa, Abergele. [X7529

BARGAINS.—Anto-Wheel, £7/15; Moto-Reve, £9/15; Douglas, £13/10; 3½h.p. Brown, 3-speed, £13/10; Royal Enfield lightweight, twin, £16/10; 3½h.p. Centaur, 2-speed, £18/10; Alldays 2-stroke, £19/10; B.S.A. 3-speed, £28/10; 1913 Douglas, 2-speed, £28/10; 1916 Harley-Davidson combination, practically new, guaranteed 3 months, £78/10; no offers; please call.—Douglas S. Cox, the absolutely straight motor man, 6c, Lansdown Hill, West Norwood, S.E. Established 1902. (See Cars.) [9608

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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South Africa—Central News Agency, Ltd. Paris—Smith's English Library, 248 Rue Rivoli.

Decline of Second-hand Values.

CONJECTURE has never been so rife as it now is on the question of the maintenance of second-hand prices. As is well-known, practically every Government action during the war has had the effect of enhancing the values of existing machines, and as a result the prices ruling at the outbreak of war have risen in a perfect crescendo. Probably February, 1917, represented the high water mark, for it was not until the Petrol Control Committee suddenly announced the drastic Government decision not to issue any further petrol licences after the end of March that the inflated prices then ruling were at all shaken. Though many saw in this Order the first real blow to high figures, the outlook was a wavering one for some weeks on account of the improbability of new machines being obtainable this year, and also by reason of the thought that petrol substitutes could be resorted to. But the latter comfort was swept aside by the further embargo placed upon substitutes, and now it seems that even the most optimistic agree that prices of second-hand machines have been, and are bound to continue to be, adversely affected. Such is the impression we have definitely formed after consulting different dealers on the subject.

However, so that our remarks shall not be misunderstood we ought, perhaps, to make it clear that we do not anticipate any sudden or serious fall in prices. The lack of new machines, and the continuous demand (which, however, has its limitations) on the part of people engaged upon work of national importance, will prevent any slump or sudden decline. Again, there is the fact that the output of new machines cannot be resumed immediately peace reigns, as many people suppose. It is bound to take some months for manufacturers to put their houses in order, so to speak, and resume their staple trade, and in the interim probably the strongest demand for motor vehicles will exist.

Sidecars for the Use of Fire Brigades.

IT is a source of wonder to us that motor cycles have not been more used in connection with fire brigades in this country, for they possess so many of the necessary attributes, and, when a sidecar is attached, are capable of carrying a considerable amount of equipment, such as chemical fire extinguishers and first aid apparatus. Of course, the use of sidecars for this purpose is by no means unknown, and we have from time to time illustrated such outfits in our pages, but a letter which we publish this week brings forward very forcibly the fact that, as yet, their employment is not nearly so common as it might be.

It must be quite obvious to anyone that a vehicle which can be started at a moment's notice, proceed with rapidity to its destination, and carry two or three firemen and a certain amount of apparatus, would be instrumental in checking a vast number of fires before they could gain any real hold and become serious conflagrations. The sidecar would, of course, be standing ready with an adequate supply of petrol and oil and everything on board, and it would be the work of a moment to start up and get under way—no harnessing of horses and other preparations. The saving in expense, too, would be a very great matter in the case of slight fires. A large fire engine, by reason of its dimensions, is often delayed in heavy traffic, whereas the sidecar can be accommodated in a comparatively small space and succeed where a larger vehicle might cause a collision. Our correspondent says that many such outfits are employed in America with most satisfactory results, and that thousands of fires have been prevented from spreading by their use. The serious shortage of horses, too, makes the employment of motor transport more desirable than ever at the present time. We hope that our city fathers may soon recognise the advantages of a sidecar as a "tender" to the fire engine.

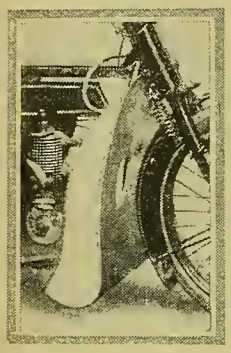
An index to the advertisements in this issue will be found on the page facing the back cover.

USEFUL LEG SHIELDS.

The question of weather protection is at last beginning to receive the attention it certainly merits. Below we give a description of two more devices of recent design.

THE "EXCEL" METAL GUARDS.

REALISING the impracticability of designing anything in the way of a standard pattern leg shield for the various and sundry types of machines requiring such fitments, Messrs. The Excel Radiator Co., 133, Foleshill Road, Coventry, have made a speciality of catering for individual tastes and individual machines. A suitably-designed leg shield can do more than merely shelter the rider's legs. It can be made to concentrate a current of air upon the cylinder, and, in the case of a two-stroke machine, it can be designed to assist very materially in the carburation of the fuel.



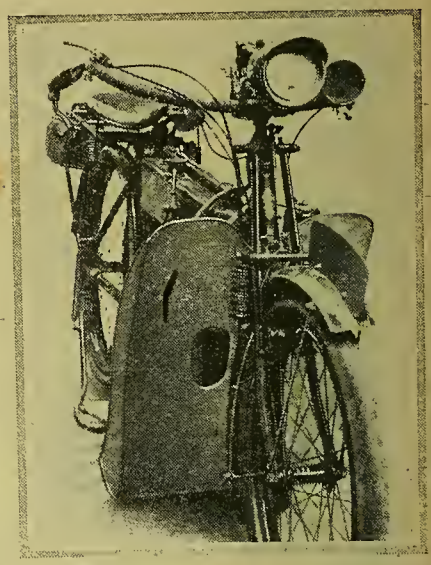
The "Excel" leg shields, as fitted to a Velocette two-stroke.

The "Excel" shield, shown attached to a Velocette lightweight in the accompanying photograph, aims at accomplishing all three of these useful purposes. In the case of a four-stroke it would not, perhaps, be desirable to box the engine in to quite the same extent, not only from the point of view of cooling, but on account of increasing the clatter of the valve tappets. With the two-stroke, however, these two points are not of much consequence, since there are no valves to clatter, and also there is much to be gained by boxing in the crank case and sheltering it from draught and a shower of cold mud.

In the Velocette, according to usual practice, the silencer is directly in front of the crank case, and this shield encloses both, so that a "backwash" of hot air hangs constantly about the crank case, keeping it at a temperature well above atmospheric, and thus preventing condensation of the gases.

We have not found the engine to overheat with this shield, as a concentrated draught plays through the air hole, and the shield is insulated from the silencer at the point where the sheeting bears against it by a sheet of asbestos. Without this packing the shield seemed very much to enhance the noises of the engine—or rather to imprison them, so that the rider was conscious of a metallic ring. We found it necessary also to pack the shield at the points where it touched the frame, and this done the noise of the engine, though certainly more noticeable than without the shields, is not unduly increased.

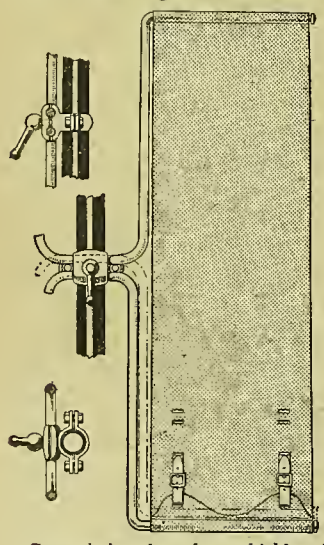
With these shields one can ride through the worst of wet mud at speed without becoming splashed, and the pockets round the footplates, adjacent to the silencer, entirely shield one's feet from draughts.



Front view showing the comparative size and effective design of the shield.

A NOVEL ADJUSTABLE TYPE SHIELD RECENTLY PATENTED.

IF anyone doubts that the mudguarding of the modern motor cycle needs supplementing with leg shields or some other additional protection, a run on ordinary English roads, after a rainy period or following a thaw, such as the past two or three weeks have produced, will probably convince him that something after the style of a "tank" is the only certain means of keeping mud away from the machine and rider.



General elevation of one shield and the clip which permits adjustment. The inset sketches show other views of the clip on the down tube.

With recollections of recent experiences, we view with much interest the latest device patented by Messrs. B. Brooks and F. J. Urry, of Great Charles Street, Birmingham. It has the merits of light weight and adjustability, both qualities which are absent in many forms of leg shield. It consists of two U-shaped frames of light tubing, carrying a sheet of some flexible material, such as leather or canvas, on either side of the machine. These two frames are carried in a special fitting clipped to the front down tube in such a way that their position can be adjusted to set the shield at the most efficient angle. With the addition of a light crossbar, held centrally in the same clip, the top half of the shields can be tipped back over the knees, as in fig. 1. The usual position without the crossbar is shown in fig. 2. A swinging flap is carried from the bottom of the shields. When not required the shield frames can be folded together, the shields rolled round them in a small compass, and set out of the way in the most convenient position, such as under the front of the footboards. Straps are provided to take up the slack of the shields when adjusted to the correct position.

Fig. 1.

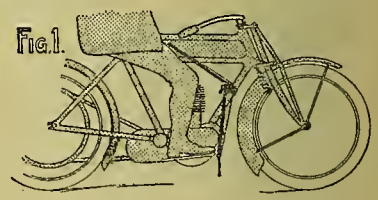
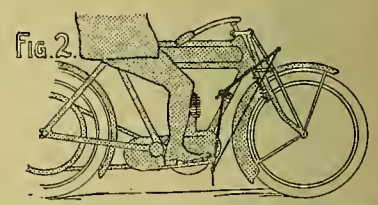


Fig. 2.



(1) The shield adjusted, with the additional crossbar to cover the rider's knees.

(2) The ordinary position of the shield without the crossbar.

LONDON ADDRESSES.

A new method of addressing letters for delivery in the London postal area has been devised. The proposal is to introduce a number, to be placed after the district initials, denoting the divisions into which the particular district has been divided. Our publishing office is London, E.C.4.

OCCASIONAL COMMENTS

BY 'IXION'

Sparking Plug Condensation.

RECENTLY, a reader complained of a failure to start his engine, due to beads of water forming on the sparking plug. This reminds me of a light car engine, owned by a member of our staff in 1914, on which all four plugs were regularly "drowned" with beads of water on winter mornings, unless it happened to start at the first swing. Like many others who are familiar with the symptoms I should like to know more of their causation. Presumably the water, like that which takes the form of snow or ice in a frozen carburetter, is condensed out of the atmosphere. But I should particularly like to know two things in reference to the matter. First, why do these beads so often form on the plugs of water-cooled four-cylinder engines, and so seldom on the single-cylinder air-cooled engines of motor bicycles? Secondly, what are the relations between them and the spark? Apparently blobs of water are wafted about inside the cylinders, and one of them gets hung up on the electrodes and short circuits them. Can it short-circuit them if it arrives on them practically simultaneously with the occurrence of a spark? Or is the starting spark so weak that it cannot disperse the water, and meekly yields to being drowned out? I do not remember being troubled with this condensation on a single-cylinder motor cycle; but I know several small four-cylinder engines which suffer from it habitually; in each case, the course of events is that, if the engine fires at the first pull, all will go well; if it fails to respond to the first swing, the plugs must be taken out and dried, after which no more condensation will occur, the free moisture in the cylinders having apparently been absorbed at the first condensation.

A Cycle Car Redivivus.

A LITTLE bird—possibly the peace dove—whispered in my ear that we may see a determined effort to resuscitate the cycle car after the war. The survivors of the last boom are certainly few in number, and though war-work may have illusive effects in that respect, seeing that only the redoubtable Morgan is now being manufactured, the boom certainly appears to have fallen very flat. As I have often said, most of the failures to produce lighter and cheaper motor vehicles in any sphere are only postponements; the twin demand for low first cost and low upkeep charges is too sturdy to brook complete neglect. Some details of a post-war cycle car, placed in my hands this week, are far more promising than any product of the last boom (the Morgan was with us before that boom began); and I think I may safely assure motor cyclists who are sighing for an alternative to the sidecar, and yet do not wish to go the length of a light car, that interesting developments may be expected. Those who are conversant with the progress of the industry know that during the war we have gained a lot of ground in two directions which are vital to the future of the cycle car, namely, the perfection of light engines, which will wear well when worked hard, and the general reduction of weight in chassis construction. I wish I could make your mouths water; but my lips are sealed. I can only say that the Scott Sociable will not have a walk over.

Acetylene Lamps.

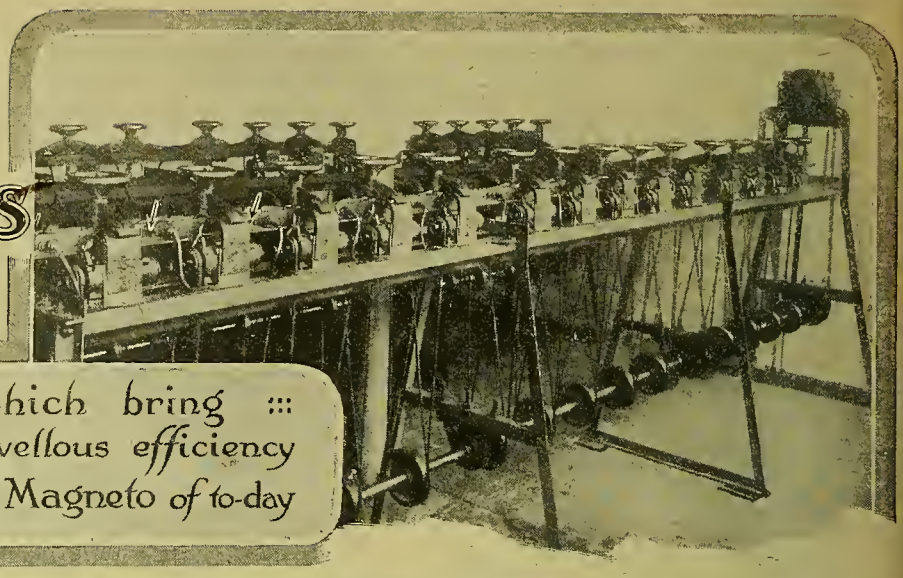
A JAUNDICED reader compliments me as being the one honest man on the motor cycling press, and demands to know if there is a single satisfactory acetylene lamp on the market. At the risk of losing my one downright admirer, I must agree with the other journalists who have informed him that any leading make should be satisfactory. Acetylene lamps always remind me of the chestnut about the Yank who went to the Pitti Palace at Florence, and on criticising the pictures was told that they were a test of the tourists. I have never met a bad acetylene motor cycle lamp or generator, and I began with some pretty cheap German stuff nearly twenty years ago. My first cost me 6s. 6d., and I was so frightened of it that I used to carry an oil lamp in reserve; but when I mastered its whims, it served me well. The real trouble is that all acetylene lamp outfits (except the D.A. cylinders) demand a genuinely methodical user. You *must* keep them scrupulously clean. You *must* be accurate in adjusting the water feed. Attend to these two points and you will have as bright a light, as little trouble, and as dead a certainty of getting to your destination as mortal man can desire in this vale of tears. But if the lamp goes uncleaned, and you turn on ever more and more water when it lowers or flickers, you may pay our best makers three or four pounds, and still end your days in an asylum. Only the men who have tested some of the experimental electrical sets know what real trouble with lamps can be.

Stolen Current.

WHICH reminds me of a yarn. Soon after war broke out, I sold a very good jigger, adorned with a fairly new dynamo lighting set, to a young subaltern of my acquaintance. The illumination was simply terrific, when there; and the set was about as reliable as one could expect a quick-discharging lamp to be with such a tiny battery as a solo mount can accommodate. I was consequently rather puzzled when he complained that in his night work he usually did the first mile at Brooklands speed, the second at Chicago Speedway rates (to get somewhere before the battery went na-poo), the third in penny numbers and steaming profanity—one hand on the bar, the other on the saddle, and a Weary Willie kink in his back—and the fourth at whatever pace characterised the first friendly vehicle to come along. The mystery was solved one night when he became officer of the guard. The official garage was a tent, adjacent to the guard tent. He discovered the guard reading *John Bull* by the bright sheen of his head lamp, with the dynamo, of course, inactive.

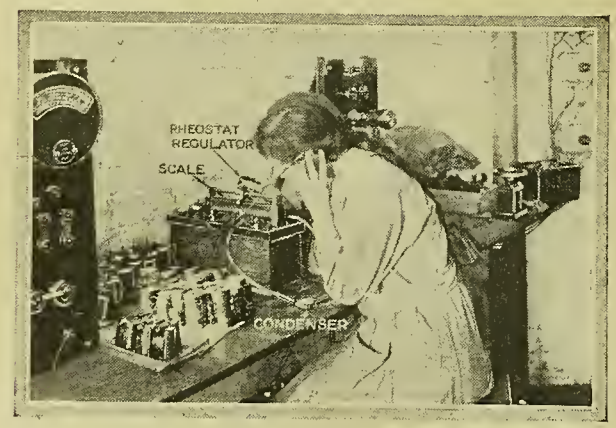
BRITISH MAGNETOS UNDER TEST

Some facts which bring home the marvellous efficiency of the British Magneto of to-day



M-L magnetos undergoing the endurance test. They are run for some hours at a speed of 2,500 revolutions. The arrows indicate the sparking points.

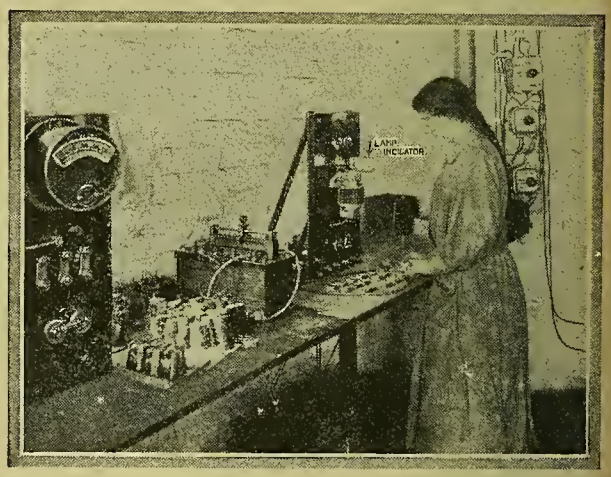
ONE of the British magnetos with which, it is safe to prophesy, every motorist will become familiar after the war is the "M-L," an instrument of first-rate design and construction made by the M-L Magneto Syndicate, Ltd., of Coventry. We were recently invited to visit the works of this firm, and, having thoroughly investigated the full course of manufacture of the "M-L," we were particularly impressed by the very high standard of workmanship and the excellence of material utilised in its manufacture. The following observations will, we think, illustrate the fact that no risks are taken as regards the ultimate reliability of "M-L" magnetos. Every part of the instrument subjected to strain, whether mechanical or electrical, is searchingly tested—firstly as a component, and secondly when assembled in the complete unit. It goes almost without saying that the company's entire output is absorbed by the Government, and therefore we cannot enter into the matter of construction, but we can, at any rate, describe the various tests to which the magnetos are put—tests which only the best design, coupled with workmanship and materials of the highest quality, renders possible.



Testing the capacity of condensers. The rheostat is adjusted till silence falls at the transmitter, the capacity being indicated by a scale opposite the rheostat handle.

Testing the Magnets.

Dealing with the testing of the components, it may be stated right away that British-made magnets are

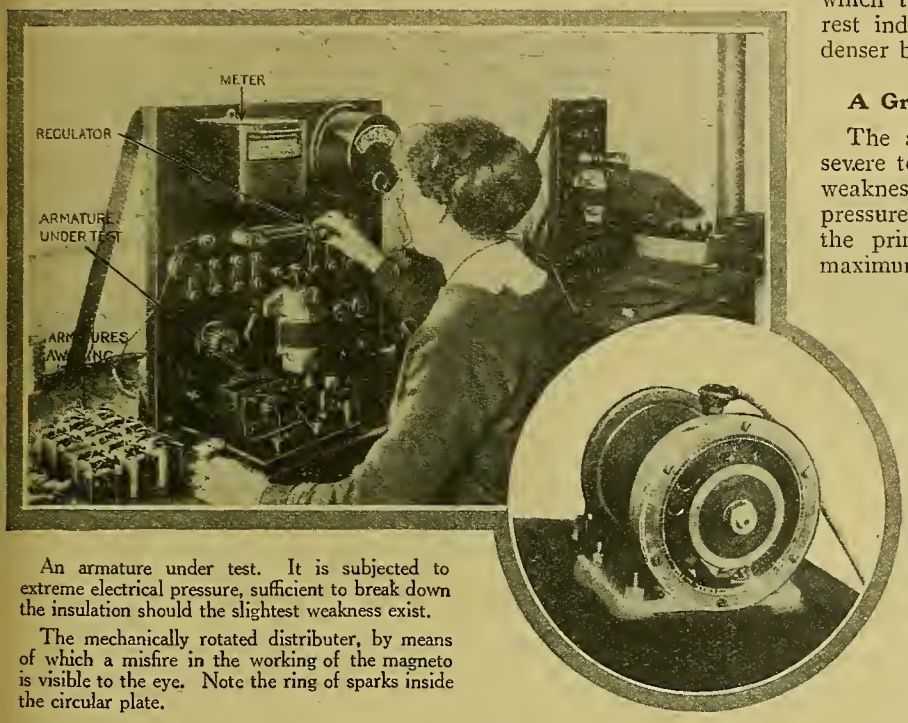


A fair electrician testing the insulation of a condenser. Any weakness is indicated by the dimming of the lamp marked with an arrow on the switchboard.

superior to German magnets of pre-war days, both as regards their power of retaining magnetic flux and also in respect to the mechanical accuracy of their manufacture. Every magnet that enters the M-L works is tested firstly to ascertain that its magnetic flux is up to standard, and secondly as regards its powers of retention. The latter point is decided by measuring the amount of demagnetising force the magnet will stand before becoming non-magnetic, the magnet being remagnetised after the test.

British Magnetos under Test.—

The condensers are tested on a circuit of 400 volts (alternating). Any weakness in the condenser is at once indicated on the instrument by an incandescent lamp on the test board, the light going dim if a leakage exists. The condenser is then subjected to a test by which its capacity is read. If the capacity were wrong it would either fail to perform its work as required, or it would do its work "too thoroughly," causing what the writer can only describe as "lag" in its operation. The condenser is connected up to an ingenious and interesting machine which resembles a combination of a rheostat and a telephone. The sliding handle of a rheostat operates over a resistance, and with the telephone transmitter held to one's ear, one slides the handle over the coil till a point is reached at which all sound at the transmitter ceases. Opposite the handle of the rheostat is a scale, so that the "silence point" at which the handle is finally brought to rest indicates the capacity of the condenser by the reading on the scale.



An armature under test. It is subjected to extreme electrical pressure, sufficient to break down the insulation should the slightest weakness exist.

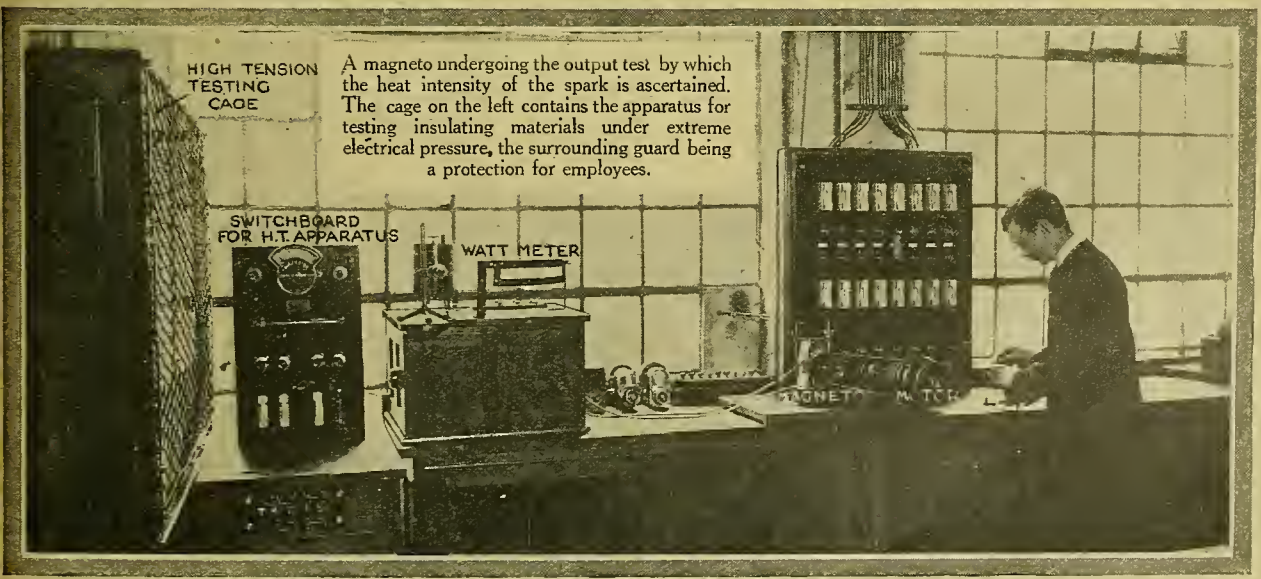
The mechanically rotated distributer, by means of which a misfire in the working of the magneto is visible to the eye. Note the ring of sparks inside the circular plate.

A Gruelling for the Armature.

The armature is subjected to a very severe test in order to ascertain that no weakness exists in the insulation. A pressure of 180 volts is applied to the primary winding, this inducing a maximum voltage of 15,000 in the secondary circuit. This enormous voltage is, of course, far in excess of anything attained under working conditions. In addition to which the frequency at which this test is made is equivalent to 2,000 sparks per second—some going!

All insulating materials are tested under high electrical pressure before being passed for use, so that failures of insulating material on the complete machine are of extremely rare occurrence.

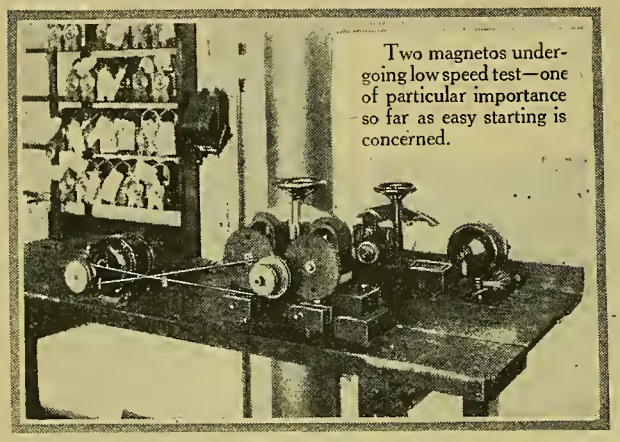
We pass on now to the testing of the complete instrument. One of the photographs shows a number of magnetos undergoing the endurance test. On this test the motor cycle pattern magnetos are run at a speed of 2,500 revs. for a period of six hours, the larger patterns being run for ten hours. The spark gaps can be seen in the illustrations adjacent to each magneto, and with several of these benches in full swing the display of electrical flames is somewhat impressive. The rotary test is equally interesting.



A magneto undergoing the output test by which the heat intensity of the spark is ascertained. The cage on the left contains the apparatus for testing insulating materials under extreme electrical pressure, the surrounding guard being a protection for employees.

British Magnetos under Test.—

In this the magneto is coupled up to what can best be described as a large distributer, rotated by its own electric motor. The object of this test is merely to ascertain that the magneto is not " missing fire " when



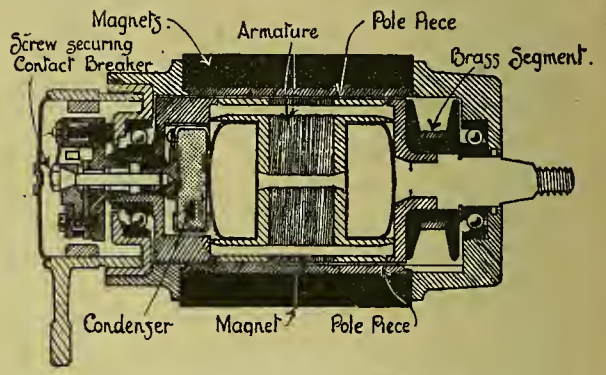
Two magnetos undergoing low speed test—one of particular importance so far as easy starting is concerned.

running at high speeds, the sparks produced being spread out into the form of a ring, so that each spark is distinctly visible, and any misfiring is at once evident, appearing as a gap in the ring of sparks.

The Last Lap.

The output test measures the heat intensity of the spark by means of a special instrument. Next the magnetos are subject to a low speed test, which is one of some importance, since it involves the question of easy starting. On this test the magneto is run at 100 revs. per minute on a 5½ mm. spark gap—surely the last straw as regards its working efficiency! The fully tested instruments are then completely taken down and re-assembled, and finally they are run for fifteen minutes on a 6 mm. spark gap.

The foregoing is, we think, sufficient to indicate the marvellous development of the British magneto since 1914. We wonder how many world-famous German magnetos would stand up to the monstrous gruelling we have described! Motorists throughout the world may as well make haste to rid themselves of any vague suspicions as regards the quality of the British magneto. It is infinitely superior to anything the world has previously produced. This may seem a bold statement, but it is the result of significant evidence. British magnetos are to-day being made by the thousand. Gigantic factories, millions of pounds of machinery, thousands of human hands, are employed in the manufacture and development of what was once a German instrument. Does the British motorist realise this? Does he realise that the war is being



Sectional plan view of M-L single-cylinder motor cycle type magneto.

won on British magnetos—tanks, aeroplanes, automobiles, submarines, motor cycles? If so, we may take it as a foregone conclusion that Germany will never win back her eminence. *We shall demand the British magneto because of its superlative value.*

New Speed Records in Australia.

An Ambitious Attempt to wipe out several Previous Records.

SOME remarkable speed records were recently established by H. A. Parsons, a Harley-Davidson rider, at Mortlake, Australia. Parsons was evidently out to clear the boards at one swoop, for his ambitious programme included the 10, 25, 50, 100, miles and the 24 hours record.

The accompanying table gives at a glance the results of the event, and it will be noted that Parsons beat the three standing records in no mean manner. The 10, 25, and 50 miles records fell to him straight away, and he then tackled the 100 miles record, but abandoned it owing to a tyre giving out.

On the evening of the succeeding day Parsons started out to beat Baker's much-coveted twenty-four hours world's record. A schedule of forty-four minutes to the lap was prepared, but in spite of warnings from his backers to the effect that he was riding too fast, Parsons performed lap after lap in thirty-three minutes. At the end of the first three hours he had covered 177½ miles, and was forty-five minutes ahead of his schedule, but it was clear that such terrific speed could not be maintained. During the night the electric batteries twice gave out, a sharp stone cut through the rear tyre, the air shutter of the carburetter had to be replaced, and at 5.15 a.m., when on the tenth lap, the back piston gave out under the strain. Altogether Parsons covered 508.7 miles in 11h. 50m.

Distance Miles.	Previous Record.	Rider.	Parsons's New Record.
10	7 min. 45⅘ sec.	J. Booth (Indian).	7 min. 21⅘ sec.
25	23 min. 55⅘ sec.	E. Taylor (Indian)	22 min. 9⅘ sec.
50	48 min. 30 sec.	E. Taylor (Indian)	44 min. 32⅘ sec.
100	95 mins.	H. A. Parsons (H.-D.)	Not ridden.

THE NEED FOR PAPER ECONOMY.

The only way to ensure regular receipt of this journal is to place a definite order with your newsagent, or the publishers.

This action will enable newsagents to limit their orders to the actual number of copies required, and so effect a saving of paper, labour, and railway transport.

BORE-STROKE RATIO.

A COMPARISON BETWEEN MOTOR CYCLE AND CAR ENGINES.

FOR many weeks past an interesting discussion has taken place in the columns of *The Motor Cycle* on the above subject. During the discussion reference has been made many times, and by many different writers, to practice in the motor car world, so perhaps more attention given to this subject will be interesting and instructive.

In motor cycle practice, the single-cylinder Norton is held up as being the most prominent example of the long stroke engine, engines of 79 × 100 mm. being generally considered as of medium stroke, while short stroke engines are approximately square, as, for instance, 85 × 88 mm., and in some cases the stroke is even less than the bore.

A great fact which all who are interested in this subject should bear in mind is that, as strokes go in proportion to bores in motor car practice, a stroke of 120 mm. is between medium and short, when coupled with a bore of 82 mm. Of course, in the car world practically all engines are of the four, six, eight, and (of late) twelve-cylindered variety, which makes a difference; they are also water-cooled, which reduces to a minimum the liability to knock and "pink" when carbonised and under heavy load. As all car owners know, a long stroke engine in bad condition, or heavily carbonised, is far more liable to "pink" than is a short stroke engine in a similar state.

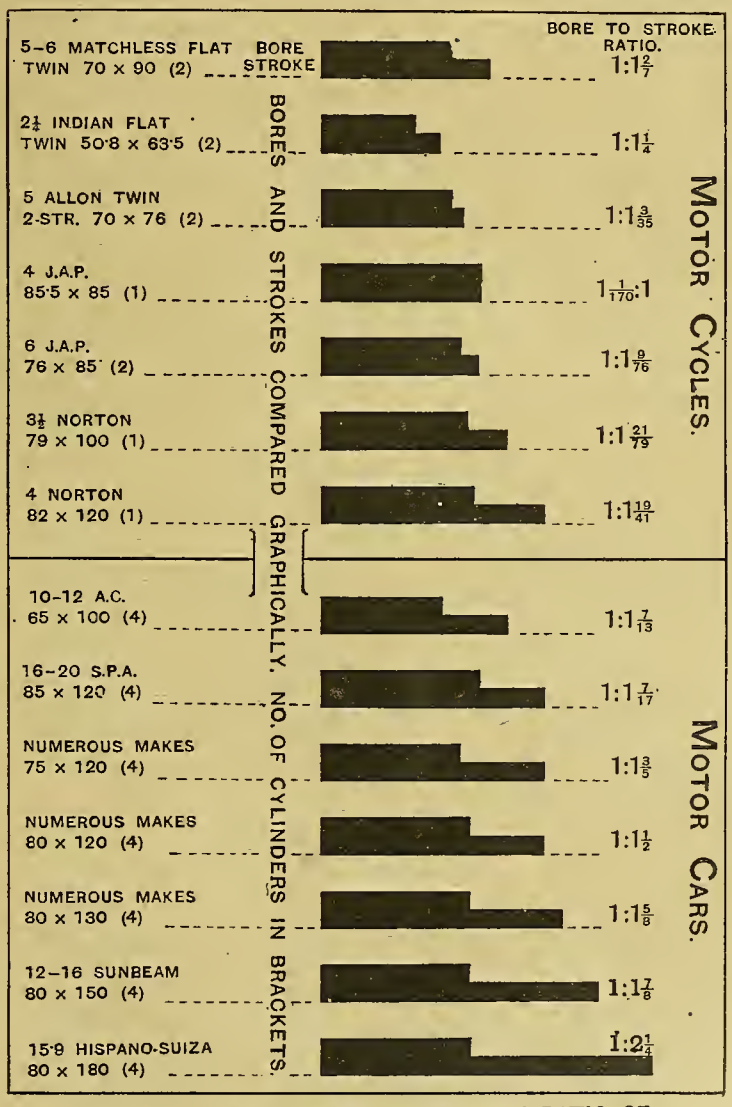

BORE TO STROKE RATIO.
5-6 MATCHLESS FLAT TWIN 70 × 90 (2)
BORE
STROKE
1:1 2/7
2¼ INDIAN FLAT TWIN 50·8 × 63·5 (2)
1:1 1/4
5 ALLON TWIN 2-STR. 70 × 76 (2)
1:1 3/35
4 J.A.P. 85·5 × 85 (1)
1 1/170:1
6 J.A.P. 76 × 85 (2)
1:1 9/76
3½ NORTON 79 × 100 (1)
1:1 21/79
4 NORTON 82 × 120 (1)
1:1 19/41
BORES AND STROKES COMPARED GRAPHICALLY. NO. OF CYLINDERS IN BRACKETS.
MOTOR CYCLES.
10-12 A.C. 65 × 100 (4)
1:1 7/13
16-20 S.P.A. 85 × 120 (4)
1:1 7/17
NUMEROUS MAKES 75 × 120 (4)
1:1 3/5
NUMEROUS MAKES 80 × 120 (4)
1:1 1/2
NUMEROUS MAKES 80 × 130 (4)
1:1 5/8
12-16 SUNBEAM 80 × 150 (4)
1:1 7/8
15·9 HISPANO-SUIZA 80 × 180 (4)
1:2 1/2
MOTOR CARS.

DIAGRAM SHOWING BORE AND STROKE RATIO OF MOTOR CYCLES AND CARS.

Car Engines.

In case my statement that "practically all car engines are of the four, six, eight, or twelve-cylindered variety" should be challenged, I will say that, though there are two-cylindered engines to be found on some small cars still being manufactured, they are only retained on account of their low cost and simplicity. Moreover, their number is diminishing rapidly.

Now let us consider what strokes are commonly used in the motor car world to-day, taking a bore which is largely used in both car and cycle fields, or bores not far removed from it; that is, 80 mm. In the year 1912, a car having an engine of 80 × 120 mm. with four cylinders was considered very nicely proportioned—that is, of a very serviceable nature. Nowadays, however, that stroke-bore ratio is somewhat shorter than the average, 80 × 130 mm. being more usual, while 80 × 150 mm. is far from unusual In at least one case—that of the 15.9 h.p. Hispano-Suiza — we have a four-cylinder engine of 80 × 180 mm.! That is, a stroke of two and a quarter times the bore. And yet many readers of this journal criticise the 82 × 120 mm. Norton on account of its very (?) long stroke! It will be seen that the stroke-bore ratio of this engine is long only as motor cycle engines are classed; the majority of such engines are not very far removed from the square variety, whereas approximately square engines are extremely rarely found on cars, and then only on low class cars and others having "woolly" engines. I should also say that they are sometimes found on "freak" cars.

I must at this juncture emphatically state that I am not trying to make out a case for either the long or the short stroke; I have no interest whatever in any make of motor cycle or car.

Single-cylindered Engines.

At the time when single-cylindered engines were used extensively on motor cars, about the years 1896-1904, the engines were practically all of the short stroke or

Bore-stroke Ratio.—

square variety, just as all early engines were, no matter how many cylinders they possessed. The long stroke is a modern development; it is interesting to speculate whether, were single-cylinders still used largely on cars, the cylinders would have remained short or, as they have done on the majority of motor cycles, almost square.

A Different Problem on Motor Cycles.

Interest in this question of stroke-bore ratio has cropped up in motor cycle circles much later than in that of cars, where it was at its height about 1913. At that time, the two firms of Vauxhall and Sunbeam were furiously debating whether an engine of 90 × 120 mm. was superior to one of 80 × 150 mm., both being of four cylinders and called upon to perform approximately the same amount of work. The two types were respectively championed by the two firms, and to this day neither firm has radically altered its opinions. One must make allowance for the fact that the stroke-bore ratio is an entirely different problem with a single-cylindered air-cooled engine from what it is with a water-cooled "four," and the fact that motor cycles, on the whole, have a smaller ratio than that used in cars does not mean that our makers are behindhand. The matter has still to be threshed out. Nevertheless, comparisons are interesting.

The graphs will illustrate the topic more clearly than words. BEE.

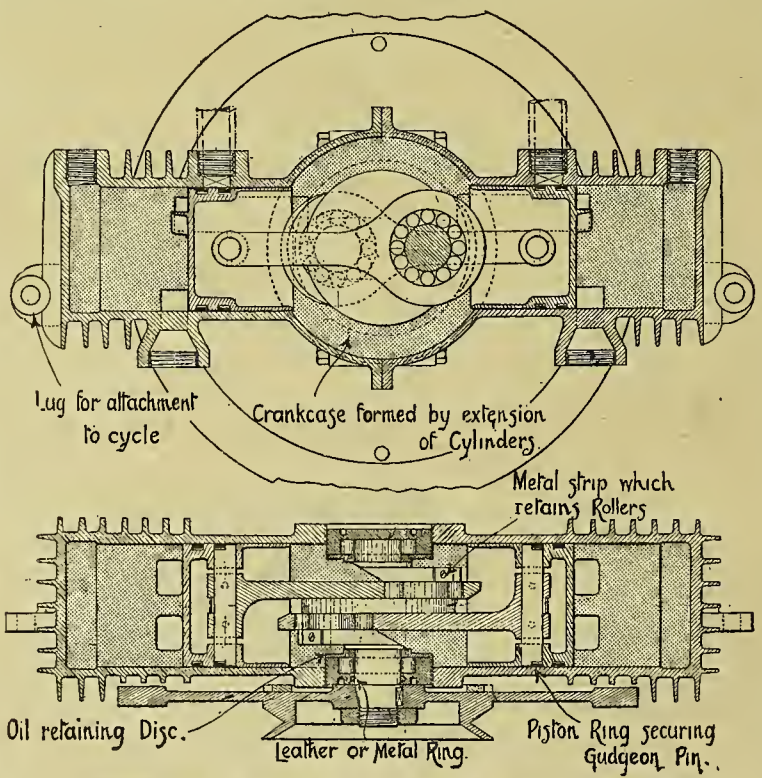
SIMPLIFICATION.

Some Methods of reducing the Number of Parts in an Engine.

MR. J. D. ROOTS, M.I.Mech.E., has taken out a patent (No. 15,306, 1915) for simplifying the construction of an internal combustion engine by reducing (1) the number of parts, (2) the cost of production, and (3) the size and weight of the engine. The invention is described as applied to a two-stroke flat twin, though why this type is selected in face of certain obvious disadvantages—*e.g.*, the fact that both cylinders fire together, and consequently the torque is equivalent to that of a two-stroke single cylinder—we are at a loss to understand. We are aware, of course, that such an engine can develop considerable power, and that the balance is excellent.

Roller bearings are employed for the big ends, and the cranks and connecting rods are so bevelled that the former can be threaded through the latter, as is done in the A.B.C. engine; the rollers which bear directly upon the crank pin and connecting rod are then inserted one by one through an orifice cut in the crank. This is then closed by a strip of metal fastened by screws and the rollers secured in position. The central web of the crank is preferably in the form of a disc.

The crank case is formed by extensions of the cylinders, as can clearly be seen in the upper drawing, bolted together in the middle. These form housings for the outer parts of the main roller bearing which are externally threaded to fit corresponding threads in the cylinder extensions, and thus are securely held when the bolts are tightened. A collar is formed on the crankshaft against which abuts a metallic ring. This is also in contact with the outer casing of the main bearings and retains the lubrication and compression. One bearing is closed on the outside, the other, through which the shaft passes to carry the flywheel and pulley, carrying a leather or metal ring.

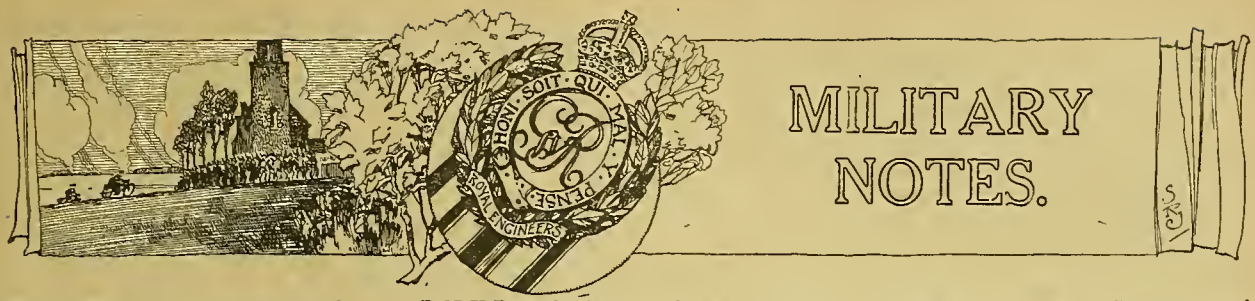

Lug for attachment to cycle
Crankcase formed by extension of Cylinders
Metal strip which retains Rollers
Oil retaining Disc.
Leather or Metal Ring.
Piston Ring securing Gudgeon Pin.

A patented form of bearing construction applied to a flat twin two-stroke.

Although the cylinders are in the same axial line the construction described is so compact that it enables the connecting rods to be only slightly out of the centre of the pistons.

The gudgeon pins are kept from rotating and from coming into contact with the cylinders by piston rings, which cover half the ends of the pins. Lugs are formed integrally with each cylinder head so that the engine, when it is built in a small size, may be firmly secured to the frame tubes of an ordinary cycle.

It will be seen that by adopting these methods of construction a very simple and compact engine is produced.



MILITARY NOTES.

THE MAIL OF THE A.S.C.

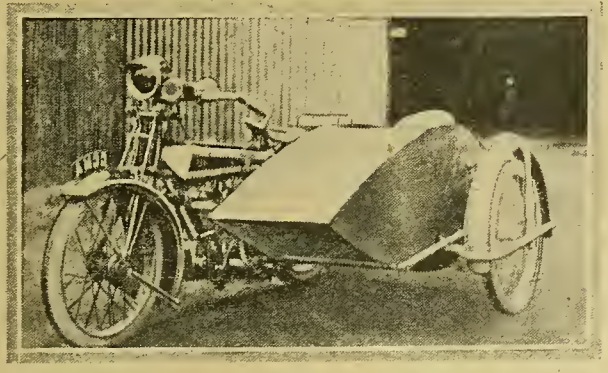
THE arrival of the mail is a time of anticipation on all the fronts, whether in the mud of France or midst the sand of Egypt, Mesopotamia, or India. The heavily loaded Abingdon King Dick

How the military weekly mail is carried in India. Pte. A. H. Hitching, A.S.C., M.T., with his well-loaded Abingdon King Dick.

carries the weekly mail arrived from England, and judging from its size, "wives" and "sisters" have been very busy. Pte. A. H. Hitching, A.S.C., is the rider, and is postman for the company.

AEROPLANE SIDECAR BODIES.

THE sidecar illustrated on this page has quite an interesting origin. Unquestionably it is the most original form of sidecar ever devised—quite a *rara ovis* indeed. The body is composed of parts of crashed aeroplanes, and contains bits of five different types. It is covered with ash three-ply, and French polished, and looks quite smart by contrast with the chassis, which is painted Sunbeam blue. The chassis is a Mills-Fulford spring wheel of the standard type. The machine to which it is attached is a twin A.J.S., of which delightful mount its owner, Lt. Frank H. May, R.N.V.R.—who is not unknown to many of our readers—speaks in the highest terms of praise.



A *RARA AVIS*.

A sidecar body manufactured from the débris of five aeroplanes which have at various times crashed to the ground.

RECRUITING CLOSED FOR MOTOR CYCLISTS IN R.F.C.

THE Editor of *The Motor Cycle* has received from Maj. R. Mitchell, organiser of R.F.C. technical instruction, the following letter:

"The Authorities have decided to stop recruiting of motor cyclists for the Royal Flying Corps. Will you please make this known, and accept my thanks for your valuable assistance in securing the fine lot of men who have passed into the R.F.C., M.C. Branch? The Royal Flying Corps is still open for motor transport drivers in Classes B1 or B2."

EVIDENTLY A HAY-MOTOR!

AS we assumed, the arguments of "The Critics" are appreciated at the Front as much as anywhere. We have received a letter from a friend in the Services, who remarks that "out there" they have arguments galore. He asks if we have ever heard that the running of a motor cycle when passing a field of growing clover is materially affected? The writer had not experienced it himself, but one of his chums who has done a lot of riding asserts that he has noticed the phenomenon time after time. The informant stated that the engine lags, and power seems to fall off unaccountably unless the throttle is opened up. We are told that the theory was advanced quite seriously, though we must confess that we have never heard of it before, and it strikes us as being a most ingenious diagnosis of falling off in power. Can any reader confirm the experience, and, if so, assign the cause?

A GOOD RECORD.

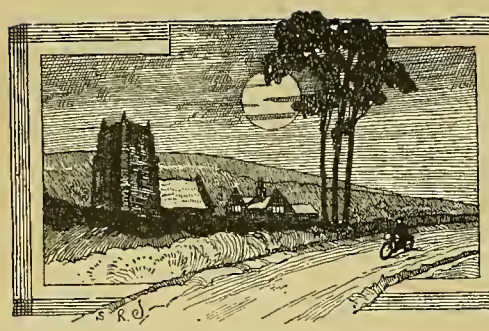
FIRST AIR MECHANIC S. F. WATSON reports having ridden 25,000 miles on various P. and M. machines since the autumn of 1914, mostly in France. Concerning his mount, he has a number of interesting criticisms to offer, and sums up: "The machine is really the most reliable power unit I have ever had anything to do with, and I started on the game at the age of fourteen. The P. and M. has never on one single occasion let me down, and I have yet to hear of a valve breakage."

S. F. Watson, 1st air mechanic, R.F.C.

DESPATCH RIDERS AND DESPATCH RIDING.

TO be a motor cyclist despatch rider attached to an artillery brigade is a position of excitement beloved of the young and dashing motor cyclist. We have before us a most interesting letter from such a D.R., who tells us that the mud in his district is liquid—something like Quaker oats lightly boiled—and reaches the laces of one's boots for considerable stretches. Even so, the roads, he considers, are good compared with the Belgian surfaces. The houses round about have no roofs, he mentions, and guns bang away from local back gardens, belching forth shells of all sizes. The work of despatch riders is very varied, which accounts for motor cyclists' experiences differing so widely.

Some D.R.s report many casualties in their section, whilst others admit that they have never been within miles of the firing line. In the case of the D.R. in question, the position is advanced, and the work is always within sound of the guns just behind the fighting front. All night long the rat-tat-tat of machine guns can be heard, and star shells frequently light up the horizon. In the daytime rifle fire and gun fire help to keep one mindful of the surroundings.



THE HISTORY OF ROAD CONSTRUCTION.

SOME DETAILS OF ANCIENT AND PRESENT-DAY PRACTICE.

THERE are distinct traces throughout Britain of roads of excellent quality having been constructed during the period of the Roman occupation. At that time they formed arteries running from coast to coast, with branches to inland fortresses. During the Middle Ages those roads were evidently allowed to be overgrown and to disappear, little attention being paid to roads generally, until about 1750, when numerous turnpike Acts were passed. In Scotland, however, and principally in the Highlands, several good military roadways were constructed by General Wade to provide facilities for moving his troops in the unsettled periods between 1715 and 1745. One of these roads in particular is in use to-day, and the greater portion of it as constructed by Wade's troops. This is the road from Arrochar, over "Rest and be Thankful," to the upper reaches of Loch Fyne. It was not, however, until about the year 1820 that the road problem was seriously attacked.

McAdam and Telford.

There were two pioneers in road construction whose methods were adopted and are in use at this date. They were respectively McAdam, an Ayrshire road surveyor, and Telford, a Dumfriesshire mason, whose *forte* was principally bridges, but he was also an authority on roads. McAdam, from whose name the words "macadam" and "macadamising" have been applied to road metal and the process of spreading it, had an appointment at Maybole, and there carried out his first experiments. Subsequently appointed to the city of Bristol, he had the opportunity of developing his system on over 200 miles of road, with such good results that he was engaged by the Government, having a staff of over 300 road surveyors under him. A notable repair carried out by him was the Dundee-Perth main road. He was also manager of the Metropolitan roads. Telford, whose system was very similar to McAdam's, was also engaged by the Government. Among his notable works are 900 miles of Highland roads constructed during eighteen years at a cost of £450,000; ninety-three miles of the Glasgow to Carlisle road, costing £50,000; and the Shrewsbury-Holyhead road. These works were carried out under Government grants, as local authorities were unable to finance the improvements. The advent of railways caused roads to be less used, except those running at an angle to the railways, which were used as feeders.

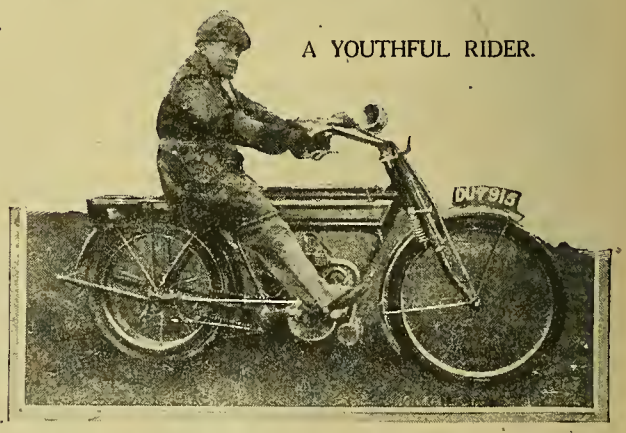
Advent of Road Rollers and Stone Crushers.

The only outstanding improvement since the days of McAdam and Telford was the introduction of steam road rollers about the year 1870, when the first steam roller was used in Edinburgh; it weighed about 30 tons. By the year 1880, road roller construction and design had reached the efficiency and the appearance that it has to-day. Mechanical stone breaking machines were introduced from America about 1865. The machines in use to-day are on the same principle, but about 1885 improvements were introduced whereby the broken stone could be elevated and loaded into carts without hand labour. Until 1900 no necessity arose to alter the methods of construction or repair of roads, but the advent of the motor car and commercial vehicle altered this. Measures had to be taken to strengthen the road foundation, improve the wearing qualities of the surface, and prevent dust.

Tar-surfaced Roads.

Several devices have been tried in connection with the latter object, but the only one to survive has been the use of refined tar or compounds having bitumen for their basis. Government had again to come to the assistance of local authorities to meet this extra cost, and appointed the Road Board to give free grants and long loans with the object of improving the wearing surface and preventing dust nuisance. Large sums, amounting to about £1,000,000 per annum, were being paid previous to the war. This amount has been greatly curtailed, and all improvements pertaining to strengthening, straightening, and new constructional work have been stopped; but to maintain the work already completed, and especially as refined tar is a by-product from the manufacture of high explosives, grants are still made. Otherwise deterioration taking place on the roads already treated with tar would involve all the work being undertaken again.

A YOUTHFUL RIDER.



W. E. Bullock, jun., son of Mr W. E. Bullock, of Messrs. Singer and Co., Ltd., is a keen motor cyclist, and, although only 14¾ years old, manipulates his Singer lightweight ably and confidently.

Ariel

"My machine has now run 30,000 miles without any renewals to engine, except rings and valve springs."

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That is the kind of service the Ariel gives : always long and satisfactory.

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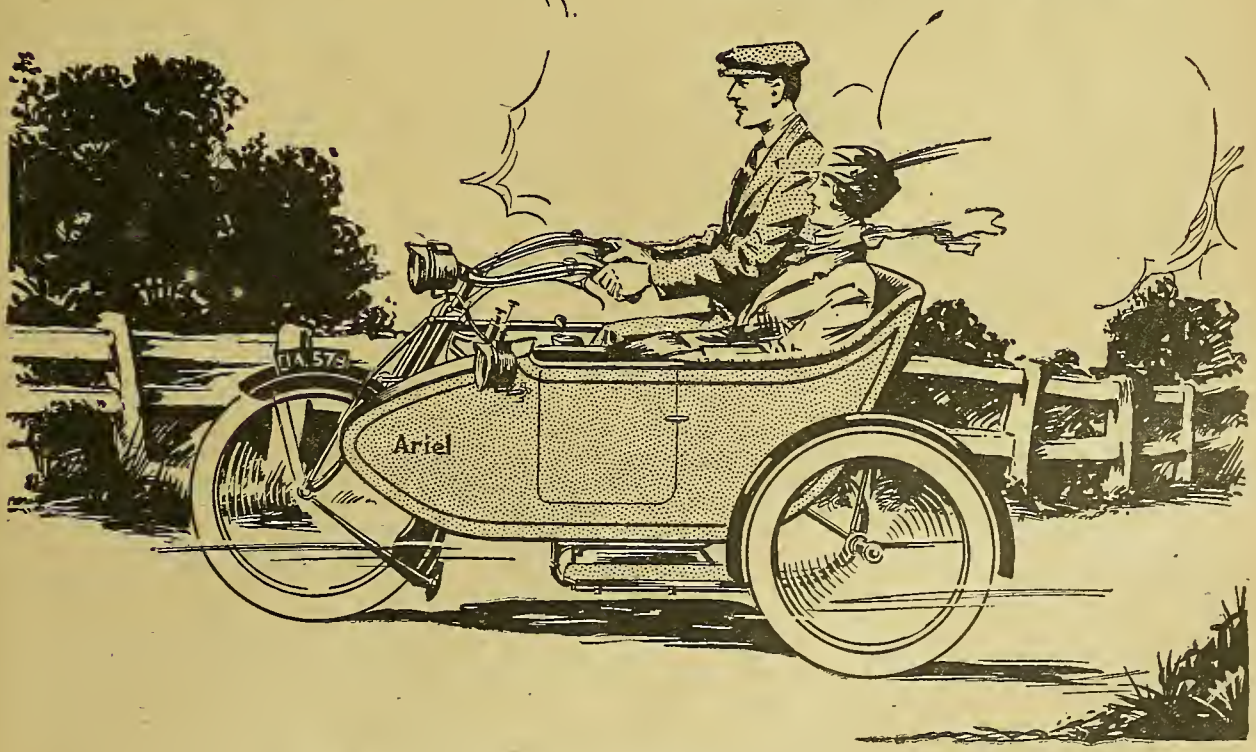

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are "essentials" that do not admit of "substitution."

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MOTOR CYCLE TYRE

is subjected to a most rigorous examination before leaving our Factory. Present conditions call for economy, and the best is without doubt the cheapest. That is just one of the reasons why you should fit Wood-Milnes. Another is, that they are **British Made** throughout.

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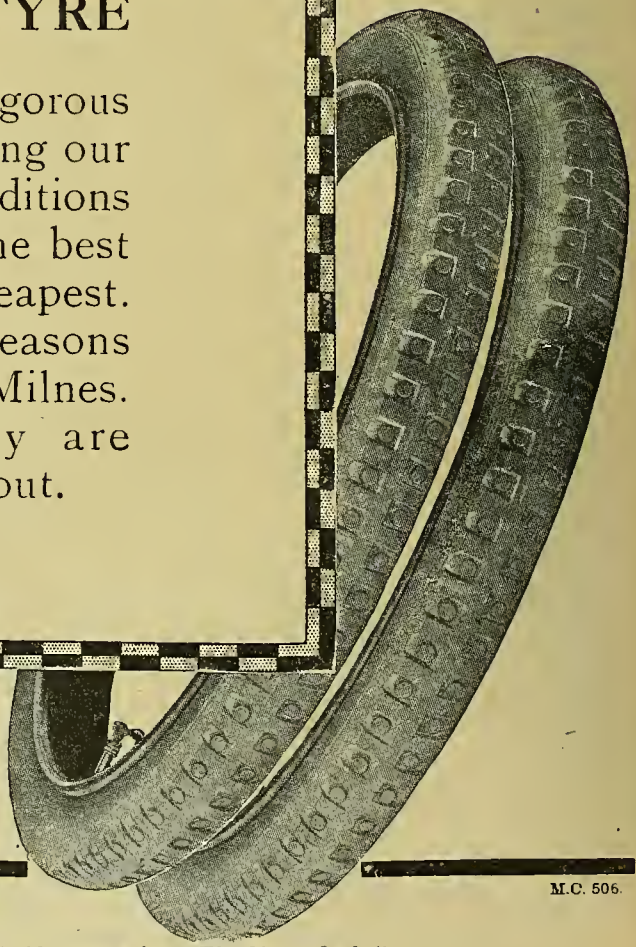

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"The Motor Cycle" and its Readers.

The Advantage of Placing a Definite Order.

FOR some time past announcements have been appearing in *The Motor Cycle* urging upon readers the desirability of placing an order with a newsagent or the publishers for the regular supply of the journal each week. In spite of this, many persons seem still to rely upon securing a copy haphazard from the most convenient bookstall or newsagent's shop. This, however, leads to waste, as newsagents have to keep a stock in anticipation of such chance sales.

To *order* a regular copy of the paper will prevent the waste of unsold copies, which was inevitable under the old system.

The restrictions placed by the Government on the supply of paper, and the vital importance of saving both labour and transport, are now likely to render chance purchases impossible.

The whole position has recently become much more acute, and there is a possibility that all the newspapers throughout the country will adopt shortly the policy of no longer sending out copies on sale or return. This means that the great bulk of the newsagents throughout the country will find it necessary to order only the exact number of copies that they have been asked for, simply to avoid the risk of unsold copies being left on their hands. It is obvious that under such conditions newsagents will no longer be able to cater for the chance purchaser.

If this movement with regard to "no returns" becomes general—and it is highly probable that it will; in fact, before these lines are in print it may have been made the subject of a Government Order—readers of *The Motor Cycle* will find on Thursday mornings that the newsagents have no spare copies, and unless they have given an order for a copy to be reserved each week they will be unable to get one.

All that is necessary is to tell your newsagent or bookstall clerk to reserve you a copy of *The Motor Cycle* each week, or, if preferred, fill in the special order form which is printed in this issue (page 8) and hand this to him. By so doing you will ensure yourself against possible disappointment in future, and, incidentally, be lending assistance to the movement for national economy.

Advice to Buyers of Second-hand Machines.

IN purchasing a second-hand machine general appearances go a long way, because they tell whether or not the machine has been carefully used. If its appearance is not up to much one is almost certain to find something entirely wrong. A good many owners forget that a motor bicycle has two parts—an ordinary cycle and a power unit to drive it—and while they are prone to bestow abundant attention on the engine they are very apt to neglect the minor parts and bearings of the cycle.

When purchasing a second-hand machine a careful examination should be made, therefore, of the steering head, hubs, spring forks, and links; frequently there is plenty of wear noticeable in these parts through continuous lack of lubrication.

When the controls are in a neglected condition, the plug wires untidily arranged, taps loose, tanks indicating leakage, etc., one can be pretty certain that something in the way of a general overhaul will be desirable. For proper examination have the machine jacked up on its stand and first try the compression. This is done by opening the throttle about one-third and turning the back wheel round. There should be a great resistance, more or less of a springing nature, when the piston reaches its compression stroke. Each cylinder should be examined in case of a multi-cylinder engine, and should give approximately the same resistance. Play in the transmission or in the engine can also be most easily located with the back wheel off the ground.

Examine carefully the engine bearings and also the bearings of the shafts in the gear box by shaking them by hand. Next see whether the valve stems have too much play in their guides, as this will upset the slow running. Turn the engine over till the tappet is free from the stem, and then feel if there is any side play in either of them. Also look out for wear in the throttle piston and the chamber in which it slides, as this will render the machine quite uncontrollable. See that both wheels are in a perfectly straight line, this being most conveniently ascertained by wetting the tyres, then wheeling the mount over a boarded floor. If one has so far discovered no faults it is as well to turn one's attention to minor points. There might be some hidden mystery somewhere. Acetylene welding may be all right, but the value of a machine thus repaired is decreased. Also insulation tape is a fine cover for mischief.

A. W. ROMYN.

SECOND-HAND PRICES.

IN a leader this week we comment on the possibility of the present high prices of second-hand motor cycles declining on account of the petrol and substitute restrictions. Our readers may be interested to hear the views of certain members of the trade.

The firm of A informed us they were prepared to sell any second-hand machine in their premises at absolutely cost price.

Firm B stated that, while there was not much doing, those machines which were sold made the same prices as had held good for several weeks, and the few people who purchased machines bought them at a good price.

Firm C considered there would be no object whatever in reducing the prices of second-hand machines because motor cycles were still hard to obtain.

Firm D stated that they were paying £10 less than they were prepared to pay when buying a good second-hand machine previous to the restrictions. They thought prices would still be maintained on the few occasions when sales were effected.

CURRENT CHAT

TIMES TO LIGHT LAMPS.

GREENWICH TIME.

Mar.	22nd	... ...	6.44 p.m.
,,	24th	... ...	6.48 ,,
,,	26th	... ...	6.50 ,,
,,	28th	... ...	6.53 ,,

A Vanished Dream.

At one time we talked glibly about using potatoes as a source of fuel. Nothing is further from our thoughts to-day.

True Thrift.

All the same, we recently saw the rider of a lightweight in a Midland suburb stop and dismount in order to pick up a potato dropped from the greengrocer's cart. Whether he intended converting it into fuel or a shepherd's pie we did not ask.

British Magnetos under Test.

The article in this week's issue describing the various tests to which M-L magnetos are put ere they leave the works should be keenly read by every patriotic supporter of home industries. It is very gratifying to know that not only have British magnetos reached a very high standard of efficiency, but also that, after the war, we shall have them in sufficient quantities to meet all demands.

Electricity and the Motor Cycle.

In briefly reviewing the booklet entitled "The British Magneto," which, it will be recalled, was produced to show what *The Motor Cycle* had done to encourage the British magneto industry, our contemporary, *Electricity*, says: "It should be read and its contents digested by every motor car and cycle manufacturer and user as an inducement to support the home industry in this essentially Hun monopoly after peace has been declared. Our contemporary is to be congratulated upon its good work in this connection."

An Unfair Comparison.

In its issue dated February 1st an American contemporary, under the heading "Racing Here and Elsewhere," makes several comparisons which are obviously unfair as regards track pacing machines. The sub-title to the article is: "Our small motors show better speed than the larger pacing machines of Europe," but in the illustrations a modern Indian pacing machine is shown beside European monsters of at least ten years ago. One of these monsters is illustrated with Cissac in the saddle, and Cissac was killed about 1909. All the European monsters shown can only be regarded as interesting relics of a bygone age.

Rival Agriculturists.

An Overseas contemporary illustrates a "caterpillar" crawling through a potato field. His presence there appears to be about as beneficial to the crops as that of his cousin the wire worm.

A Substitute Tip.

We would advise users of substitutes not to fill their tanks brim full, as if this is done fuel is bound to spill from the vent, and instead of evaporating, as petrol does, the liquid gets on to one's clothing, with rather unpleasant results.

Storing Petrol Substitute.

A correspondent in *The Light Car* relates an experience on which he bases the theory that when a quantity of petrol substitute is left undisturbed for some time, its heavy constituents sink to the bottom of the cask, so that, if the tap is placed in that position, the first lot of fuel drawn is apt to be of a very heavy nature. We doubt very much whether this is the case, though, of course, we know that oil mixed with petrol will sink to the bottom of the tank, separating itself to some extent from the lighter elements.

SPECIAL FEATURES.

BRITISH MAGNETOS UNDER TEST.

THE FIRE BRIGADE SIDECAR.

BORE-STROKE RATIO.

The Spirit of the Deceased.

A correspondent writes to know whether he is legally permitted to use his deceased uncle's petrol permit. This is a point which we feel the deceased uncle should have made quite clear by his will, but we sincerely hope that the matter will not lead to serious family dissension.

A Winged Rival.

The passing of an aeroplane over a secluded Yorkshire valley is reported to have had a very curious effect upon the moor game. Immediately the aeroplane was heard grouse were seen to rise in vast flocks over one of the moors, and, flying high, they crossed the valley to the adjacent range—a very uncommon move for these somewhat sedentary birds. When, however, the aeroplane was gone the disturbance ceased and quiet reigned once more.

A "VARMER GILES" MOTOR CYCLIST.

The East London Motor Cycle Club (South Africa) recently organised a War Fund Carnival for the benefit of the local wounded. The fancy dress shown was worn by W. E. Courtney, and represents "Varmer Giles" aboard his modern sidecar.

Motor Cyclists at the Front.

Forty-five members of the East London Motor Cycle Club of South Africa are on service.

Repair Work Discontinued.

We have received a notice from Messrs. A. J. Stevens and Co., Ltd., to the effect that owing to Government demands they are quite unable to undertake or quote for any further repair work.

The National War Funds.

At the week-end the principal war funds stood as follow :

The Prince of Wales's Fund (distributed £3,564,508)	£5,045,278	0	0
The British Red Cross Fund ..	6,359,256	0	0
Tobacco Fund	127,132	0	0

Second-hand Prices.

The new restriction on the sale of petrol substitutes is the first serious blow the second-hand market has as yet suffered. In comparing to-day's prices of machines valued at between £40 and £50 with those of the beginning of February, we find an average drop of £7—that is, a machine selling at £47 at the beginning of February is to-day offered at £40.

Lightweight Chain-guards.

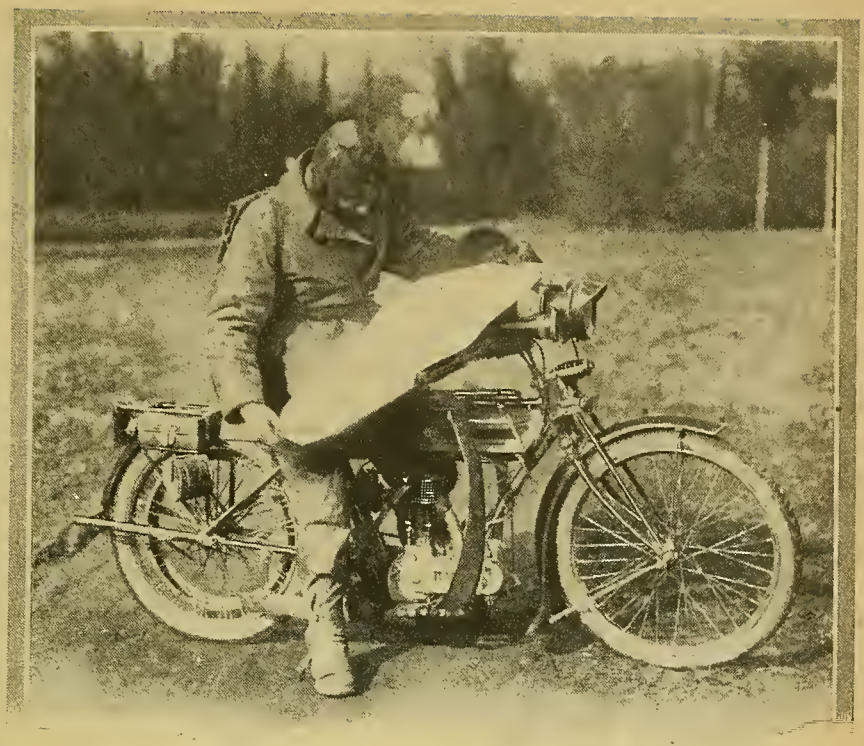
The tinny, insecurely attached chain guards of many lightweight machines are often the cause of mysterious noises. Recently we removed the chain guards of an everyday hack, and, though they appeared to be securely attached, we were struck by the silent running that succeeded their removal. Vibration of the guards against the frame was evidently the cause of the racket.

The Arbuthnot Trophy.

A facsimile of the Admiral Arbuthnot Trophy was presented to Lady Arbuthnot, widow of the late Rear-Admiral, at her house on Saturday morning. Lady Arbuthnot was exceedingly pleased with the statuette, which is a real work of art, and, as our readers are aware, was executed by that eminent sculptor, Lady Scott Lady Arbuthnot thought the likeness excellent, and, considering that Lady Scott had never seen the late Admiral, the result obtained has been extremely good. The presentation was made by Mr. E. M. P. Boileau *(The Motor Cycle)* on behalf of the Auto Cycle Union.

A Fair Motor Cyclist.

Recently on a cold and wet afternoon, when it was both foggy and raining hard, we came across a plucky girl of about twenty years of age looking miserable and tired, stranded with an 8 h.p. Zenith and sidecar on one of the main roads out of London We stopped and asked what was the matter, and she informed us she could not start the machine with the aid of the kick starter, that it was too hard for her to push off, and that the belt was slipping badly. After vainly trying to shorten the belt by means of the adjuster, and failing to shift the nut owing to it having rusted up, and also not being able to find any tools for cutting and shortening the belt, we were able to push her off and send her machine spluttering and misfiring to the nearest village. She was a plucky damsel, as she had set out quite alone on this powerful outfit to teach herself how to use it.



A D.R. (AND HIS LEG-SHIELDS) IN THE WAR ZONE

(Official photograph issued by Press Bureau.)

There are two points of particular interest about this official photograph. One is that the scene is "on the battle front"—though it looks peaceful enough—and, secondly, the improvised leg-shields are added testimony to the need for some protection of the kind, as evidenced by recent articles in *The Motor Cycle*.

Mechanical Lubrication.

Riders possessing machines having mechanical lubrication will probably find their pumps require readjusting now the weather has turned milder—otherwise smoky exhausts will ensue.

A Memorable Winter.

Motorists living in the mountainous regions of the North of England and Scotland will not have experienced much riding this winter. We are informed that the severity of the frost and the long continuance of the snow has beaten all records for twenty-two years. Sheep on the moorlands have remained buried under the snowdrifts for as long as five weeks in some parts, and wild life of all kinds has suffered sorely.

The Ban on Substitutes.

On our "Queries" page last week "H.N.," in reply to a query, was told that "At the present time one may purchase petrol substitutes, such as can be obtained, without let or hindrance, and it is to be hoped that no interference on the part of the authorities will be made." As a matter of fact, the answer was perfectly correct at the time it was despatched to our correspondent, but in the interval between press day and the date of publication a Government Order was issued restricting the sale of petrol substitutes. We think it well to clear up this point, though we have no doubt that every observant reader noted the full text of the Order, published on page 233 of the same issue.

Affording Rivalry.

In announcing that the Fleetwood Ford Co. have made substantial price reductions in their vehicles, our interesting contemporary *Motoring in South Africa* adds that: "Inevitably the reduction now announced will tend still further to widen the scope of the Ford car by bringing the roadster into competition with the motor cycle and sidecar." Such a contingency is hardly likely in the British Isles, however.

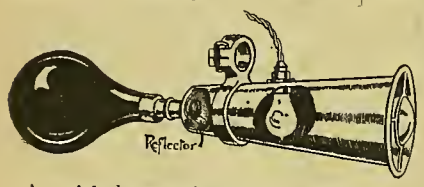
THE USES OF LIGHT ALLOYS.

WITH the object of co-ordinating the work which is now being done in connection with the use of light alloys in the construction of aircraft and aero engines, the Advisory Committee for aeronautics has appointed a Light Alloy Sub-committee, whose functions will be to advise Government Departments on questions relating to light alloys to institute research for the development and improvement of such alloys and the methods of working them, and to assist in the removal of difficulties which may arise in their production and use. Though this sub-committee is formed primarily in connection with aircraft, we venture to express the hope that its deliberations will not be exclusively confined to that section, as lessons and data at the disposal of this committee would be of inestimable value to the motor trade.

IDEAS: Useful and Ingenious.

A COMBINED LAMP AND HORN.

HAROLD HODSON (a thirteen-year-old reader), of Warrington, Lancs, sends us an idea for combining the lamp and horn. Instead of arranging the horn in the back of the lamp, as is done in the case of a number of American designs, Hodson has fitted an electric bulb inside the horn funnel. The reflector is arranged at the back end

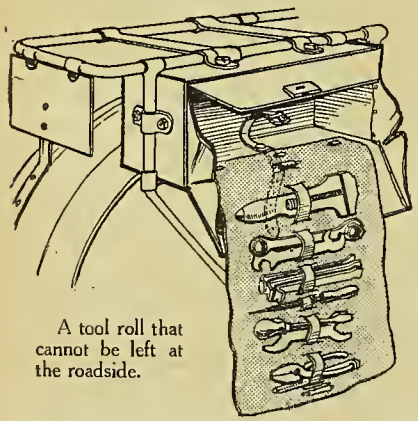


An original suggestion—a horn utilised as a lamp body.

of the monthpiece of the horn and a bull's-eye lens at the forward end. The object, of course, is to do away with so many fittings on the handle-bar of a motor cycle, and render its appearance cleaner than it is at present.

A TOOL ROLL TIP.

THE usual pannier bags are worthy of more attention by the makers than they get at present. Any leather box will do, and we are expected to fit them up how we please. A leather tool roll is the method of carriage used by most motor cyclists, usually placed

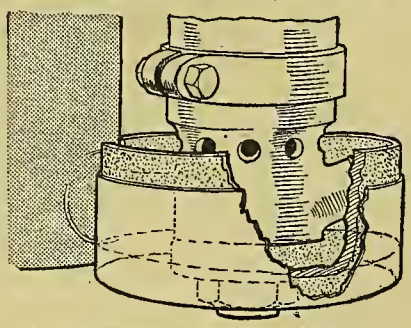


A tool roll that cannot be left at the roadside.

loose in the box, and spread open on the saddle when required, whence it promptly drops into the mud. It does not require much trouble to rivet one end of the roll to the bottom of the box, so that it will hang down over the carrier stays when in use; a strap and buckle can be added to the case to fix the whole when rolled up.

A DRIP COLLECTOR.

THE modern machine seems a very incomplete affair, to judge by the many little things which an enthusiastic owner finds he can do to improve it. Not many machines exist exactly as they left the factory (plus grime). Practically every rider has altered some little detail, or added some more or less clever idea of his own. Often these additions are merely fads, having no particular advantage except in the eyes of the proud owner, but one continually comes across small improvements worthy of attention, generally spoken of as "gadgets," a peculiar word of obscure origin. Economy is the reason



A simple design of drip collector.

for the majority of these ideas; the abnormal rise in petrol prices and its apparent scarcity have resulted in much mental strain and the burning of quarts of midnight oil in the search after ways and means of eking out the supply to the last drop. Whereas, in former days, the carburetter was flooded without regard to the amount wasted *viâ* the air holes, now many are fitted with cup-shaped arrangements to catch the drip.

One method was described a week or two ago, and another variation of the same idea is illustrated here. A tin cover of suitable size, with a hole bored in the centre to pass the jet screw, is cut out to fit round the float chamber connection. A lining of felt on the sides and bottom completes it. Any spilled petrol is absorbed in the felt, and enriches the air passing in until it is used up. Why should not some such arrangement form part of the regular design of carburetters?

HANDLE-BAR BINDING.

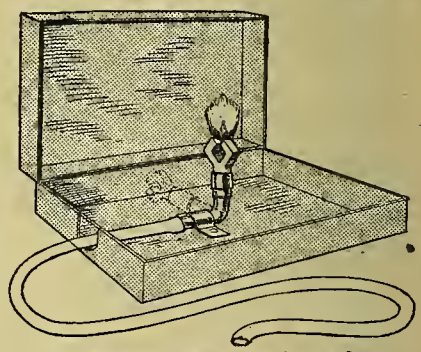
TO many riders the handle-bar looks unfinished without a wrapping of insulating tape. Often it is merely a decorative effect, or it may be a survival of old cycle racing days, when it was the custom to cover the bars with rubber, tape, or ginger beer bottle rings to give a good grip. On a plated bar it has a protective use, but in time it loses its waterproofness, and becomes like so much blotting paper, to the disgust of the rider who finds it securely rusted on. A really good job can be made by obtaining an unplated bar, cleaning up with emery cloth, binding with ordinary electrician's insulating tape in a regular spiral lap from the centre to the grips, and then applying two coats of

Rusty handle-bar wrapped with insulating tape.

black enamel. This gives a very neat finish, which is completed by the fitting of suitable celluloid or rubber grips. The binding may include the Bowden cable covers, thus giving them a permanent fixing.

A BREAKDOWN LAMP.

THE occasion sometimes arises at night. such as an involuntary stop for punctures, when a movable light is a great help. The usual way is to remove the head lamp and turn it on to the work. A small emergency light can easily be made from a flat tobacco tin. A small elbow bend is fastened to the bottom by a riveted metal strip. A hole is cut at one end to pass the



An emergency light made from a flat tobacco tin.

tubing, and an ordinary acetylene burner fitted. All that is necessary for use is to uncouple the head lamp generator tube and connect up this lamp, which will stand in any convenient position. When not in use, the burner may be turned down sideways, the tubing coiled inside, and the cover closed. The question might arise as to the infringement of lighting regulations, but it is hoped these will not be in force much longer.

THE FIRE SIDECAR.

WHY NOT IN EVERY MUNICIPALITY?

Whilst Volunteer Brigades at home have recognised the claims of the handy sidecar as a useful adjunct in their work of fire fighting, in America they are extensively used by Corporations. We suggest the inclusion of fire sidecars in every Brigade, large or small The machines illustrated include Rudge, Enfield, and Harley-Davidson.

NORTON WAR SERVICE MACHINES.

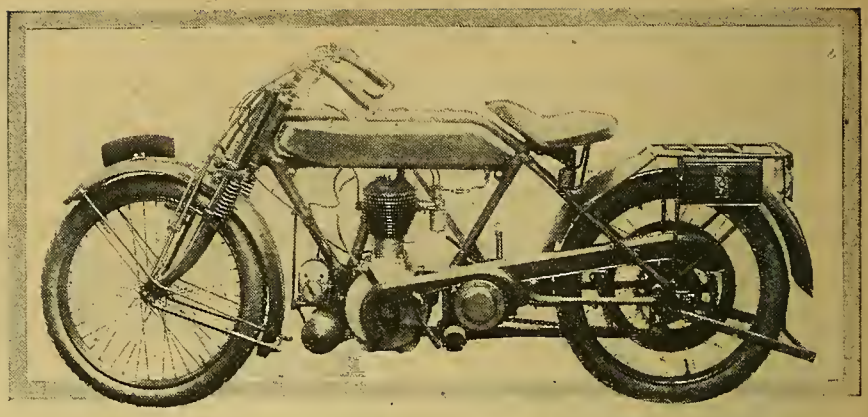
The Overseas Model adopted by an Ally.

IN our issue of November 30th, 1916, we described in detail the new Overseas model from the factory of Norton Motors, Ltd. At that time only a limited number of machines had been built, but their manufacture in large numbers, though for a different purpose, is now in progress. This is in response to a special order of the Ministry of Munitions for a regular supply of motor cycles to a particular specification. Russian Government inspectors are supervising the construction.

It is fortunate that the Norton model came so near to the specification as to require no drastic departures from the design originally intended for Colonial use. As finished for war service, in the familiar grey-green colour, these machines present a very attractive appearance, and a comfortable semi-T.T. handle-bar affords the steady control so necessary on the heavy roads existing Overseas.

Detail Specification.

The details of the machine are practically the same as we previously described. A special design of frame giving 6in. ground clearance, the Norton "big four" 82×120 mm. engine with all its latest refinements, Sturmey-Archer three-speed countershaft gear with handle-bar clutch control, B and B. carburetter, C.A.V. magneto, all-chain drive (well protected by a substantial metal cover), an unusually large tank accommodating over two gallons of fuel and three quarts of oil, exceptional mudguard clearance, and 26in. wheels with heavy 3in. Dunlop studded tyres, complete the chief features of this serviceable model, a specification long demanded by Overseas riders and our own D.R.'s.



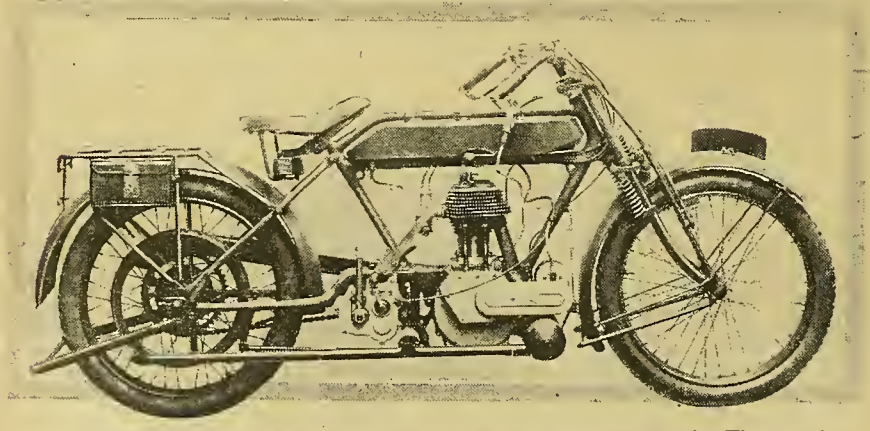
The military model of the Norton "big four." These machines are being supplied to the order of the Ministry of Munitions.

A Criticism.

We have been discussing with Mr. Norton a mysterious addition to the specification, which is as follows:

In future these military Nortons are to be provided with footrests on the front down tube in front of the engine—not at the lowest point either! This will push the rider's knees towards his chin, and changing gear will be impossible without swinging the right leg back out of the way. It will also prevent the use of knee grips on the tank. Our sympathies go out to the poor rider of a machine thus fitted when he encounters the average pot-holey road in this country, to say nothing of the war-wrecked tracks over the water. Fortunately the machines of the first batch are not so fitted, and we trust that this part of the specification will not be insisted upon.

We feel sure that the Norton will make good under the strenuous conditions to which it is destined to be subjected; its speed is well known, and should satisfy the most dashing D.R.; its reliability is also acknowledged, but it is in for a rough time on Russian tracks, much rougher than anything hitherto met with, and its behaviour will be a matter of great interest.



The details of this model are very similar to those of the Overseas model. The ground clearance is 6in., and engine dimensions 82×120 mm. Observe the heavy 3in. Dunlop studded tyres.

THE MOTOR TRANSPORT VOLUNTEERS.

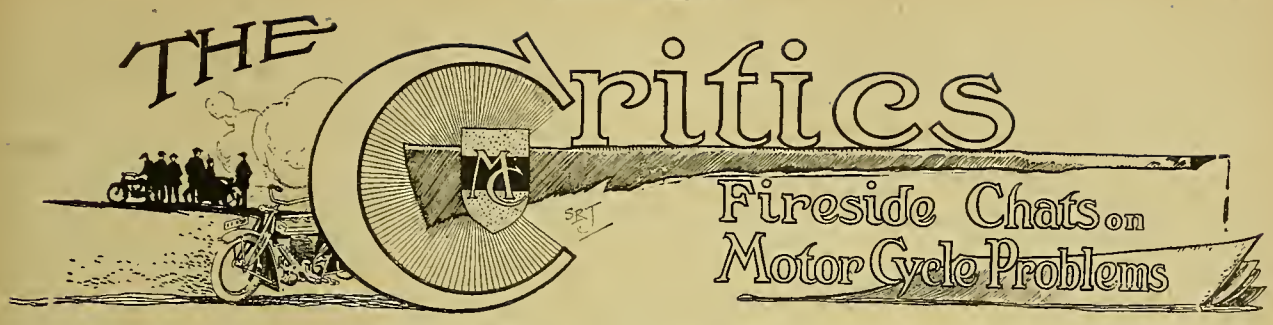
ON Sunday evening last a concert was organised by Mr. George Robey on behalf of the Motor Transport Volunteers, the performance being at the Alhambra at seven o'clock. It was of a most excellent character, the most famous artistes of the day being engaged. The programme was an artistic production, and was illustrated with reproductions from original drawings by well-known artists depicting the work carried out by the M.T.V. In the course of the evening three of the original drawings were sold by auction by Mr. George Robey at very high figures.

The work of the M.T.V. was described in a very eloquent speech by Mr. Horatio Bottomley. In the course of his stirring appeal for funds for the M.T.V., Mr. Bottomley pointed out that nearly all the work was carried out at night, at the time when most people were asleep. It relieved the War Office of an immense amount of responsibility. The duties consist in taking men on leave from the various London termini at which they arrive to other termini, whence they depart for their homes; and also acting as guides, counsellors, and friends to the soldiers.

We may point out that motor cyclists possessing comfortable sidecar combinations can join the M.T.V., and can do useful work with them. It often happens that while, say, ten men require to go to King's Cross, only one may desire to be taken to Marylebone, and in this case it is more economical to send him in a sidecar combination than in a full size car or lorry. Free petrol is granted for this service. The address of the M.T.V. is 31, Walbrook, E.C.

A FAUX PAS.

On visiting the home of Norton motor cycles last week, for the purpose of examining the new Russian military machines, we were sorry to find Mr. Norton hobbling between crutches as the result of having slipped from a step, thereby causing a sprained ankle. The injury is healing, and we hope to find Mr. Norton his usual agile self very soon.



THE SPRING FRAME PROBLEM.

"IT seems to me that the spring frame problem is too much for the British manufacturer," announced the Novice, stretching the slippers he had borrowed from the Journalist indifferently near the fire; "so he may as well own up and say so."

But the Manufacturer was used to having red rags waved under his nose, and merely grunted.

"Amateur designers send in their patents for rear springing by the score," the Novice pursued, "and——"

"And with a blissful ignorance of the subject which is really comic!" supplemented the Manufacturer.

"And the manufacturer merely twiddles his watch-chain and looks on," the Novice continued. "Why doesn't he announce that he is beaten, and that he is going to put on the market a spring seat-pillar as a half-way measure?"

"To be candid, I don't think spring seat-pillars are worth a dash," put in the D.R. "One might just as well be astride a really good saddle."

A Better Alternative.

"That isn't my experience," stated the Novice. "The spring seat-pillar on an old Rex I bought was really a topping thing, and I have never been able to understand why its use has not become general."

There was a pause, enlivened by a whiff of the Novice's smouldering slipper.

"If we cannot have a really good spring frame," said the Journalist suddenly, "it is easy enough to produce the spring saddle-pillar one stage further, so that the footrests are sprung with the saddle—Edmund fashion."

"Hur!" growled the D.R. "The objection to that system is that if you strike a pot-hole when cornering at speed the inside footrest is apt to hit the ground, and over you go. On a T.T. machine you have to have your footrests uncomfortably high on this account—that is, if you ride with your body vertical."

"We're not talking about T.T.'s and flying machines," growled the Novice. "We're talking about comfortable touring mounts."

"We're trying to discuss a system which can be universally adopted," retorted the D.R.

But the Journalist also had something to say about cornering at speed. "Everyone knows that the more rigid the frame the better for that kind of work," he pointed out. "Spring frames are admittedly off the map for cornering at speed, and what you say applies not only to the Edmund, but to all spring types."

"So kindly dry up!" added the Novice.

The Manufacturer in the meantime was staring hard at the fire and consuming immeasurable quantities of tobacco. It was difficult to distinguish between the aroma of the Manufacturer's tobacco and the smell of the Novice's smouldering slippers.

"It is the tourist and the Overseas man who want the spring frame," pursued the Novice; "and I guarantee we outnumber you speed lunatics by twenty to one. The manufacturer who studies the tourist in preference to the speed man is assured of a good dividend after the war. But why—if the proposition is not above him—has the British manufacturer failed to produce a spring frame? Look at the Americans——!"

Necessity and Supply.

The Journalist, a man of quiet calculation, removed his pipe. "Necessity is the mother of invention!" he quoted. "American roads necessitate a spring frame. In America it is worth while to sacrifice certain desirable features—such as long wearing qualities and lateral rigidity—for the sake of rear springing. Then again, the American does not demand a thing which will last indefinitely. He demands an article which he can buy cheaply, which will give him superlative satisfaction for a season or so, then he is content almost to give it away. That is the American system.

"In England we aim at producing the thing which will *last*. Their system of hustle and scrap does not apply over here. Our conditions do not really demand a spring frame. It is by way of being a luxury. Therefore the British manufacturer cannot afford to sacrifice certain desirable features for a feature which the public, while *wanting*, do not actually demand as an *indispensable necessity*."

Jack Drew, of the Royal Flying Corps, who was recently wounded. Drew is a native of Birmingham, and before joining up was prominently associated with the Midland Motor Cycle Volunteer Corps.

The Manufacturer's Opinion.

This little speech unsealed at length the lips of the Manufacturer.

"It amuses me," he said a trifle sadly, "to note how glibly you people talk. The Journalist has put the whole thing in a nutshell, and with a reverence for correct English, which is not usually to be found in the conversation of journalist circles." The Manufacturer coughed and patted his chest. He was in a lively mood. "Gentlemen," he added, "I cannot add much to what our literary friend has said. It amuses us manufacturers immensely when we read the Overseas correspondence in *The Motor Cycle*, reader after reader demanding the immediate exportation of a spring frame for the maintenance of our markets, as though it were a matter of five minutes merely to sit down, get out our designs, and export the goods. The Americans have a spring frame which has been produced on the strength of the facts the Journalist has outlined, the outcome of absolute necessity, but let me tell you that, to-day, there are a dozen spring frames in their experimental stage which will take some beating."

"After which, will you kindly pass the kissing cup, Mr. Mayor?" added the D.R.

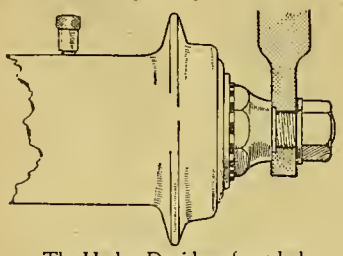
But at this juncture the Journalist, sniffing loudly, said he would just go and see what his landlady was preparing for supper. To him it smelt like a Welsh rarebit, made of rubber solution and carbide, flavoured with Binks fuel.

When he was gone the Manufacturer turned rudely to the Novice. "Take your great feet out of the fender," he commanded. "It's his own slippers he can smell!"

FRONT HUB DESIGN.

Further Notes on the Difficulty of Excluding Mud from the Front Wheel Hub.

MR. DOUGLAS W. GROVER'S recent suggestion in our columns for a mud-excluding front hub has taken the eye of several motor cycle firms, who claim to embody the same idea in their machines. We reviewed the Sunbeam front hub last week, and the Harley-Davidson Co. claim that their hub also follows our correspondent's idea in making use of distance pieces to separate the fork end from the bearing as far as possible. To quote the Harley-Davidson description, "The front wheel is mounted on a knock-out spindle which passes through the spindle proper, upon which are screwed the two distance pieces. The distance pieces are $\frac{9}{16}$in. wide, and from actual test under bad weather conditions they protect the hub very effectively from the ingress of mud and water. It should be noted that the distance pieces also prevent any movement of the bearing adjustment when the wheel is taken out. This refinement was introduced at the beginning of 1916."



The Harley-Davidson front hub has a distance piece either side to prevent ingress of mud and water.

Messrs. John Marston, Ltd., whose hub we illustrated last week, point out that in their opinion the cause of mud and water entering the front hub is that the mudguard fits close against the inside of the fork, and the fork being nearly vertical to the hub spindle, the mud and water run down the fork sides straight into the hub. This does not happen in the case of the back hub, for the reason that the back forks are set at a different angle, and there is nothing in a vertical line with the back hub spindle which can collect the mud.

Mr. Douglas W. Grover, whose letter (March 8th, page 202) revived the important matter of front hub construction, writes further as follows:

"When I wrote you with regard to front wheel hubs I purposely omitted to give the name of the machine I own, and which is one of the two machines which gave rise to my suggestion for improved protection to hub bearings.

"The machine is a 1915 Matchless, and the front wheel hub construction is practically identical with the Sunbeam illustration in your last issue printed with their letter on the subject. The only difference I can see is that one has an internal steel washer and the other a felt washer. Either is equally useful.

"It is quite evident that in hub construction you cannot avoid having two external members, one revolving and the other stationary. When these lie in a bath of sand and water wear is inevitable. The space between fork and wheel hub, so well shown in the Sunbeam picture, in really bad weather is filled up solid, the caked mud being washed all the time with the water running down the forks. If we had that extra width of spindle that I suggested, and that metal disc about four inches in diameter standing next the cone, it would surely prevent most of the wet from reaching the hub.

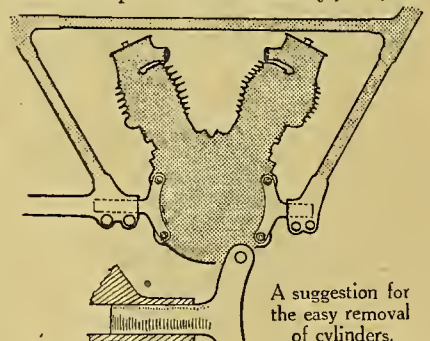
"I refrained from mentioning that it was a Matchless machine that gave rise to my letter because I am so very well pleased with the wonderful reliability of the bicycle in most other respects, but I do hope that before the new Matchless is floated some effort will be made to effect a radical improvement in the front wheel hub, but whether or not I shall have to have one."

REMOVAL OF CYLINDERS.

A Suggestion to Overcome a Difficulty.

MANY riders, on commencing the annual overhaul, discover, to their annoyance, that it is next to impossible to remove the cylinder without dismounting the crank case. The difficulty is found in all types of machines, whether singles, V, or horizontal twins. Of the latter, it is generally the back cylinder which causes uncomplimentary remarks.

If the whole unit could be tipped a little out of the perpendicular the problem would be solved. And with that idea in view, the writer suggests that pivoted cradles could be utilised, housed in special frame lugs, when, by the loosening of two or four bolts, the whole engine could be, in the case of a single or V twin, turned over sideways to a horizontal position if necessary; or, in the case of a flat twin, it could be swung across the frame at right angles to its running position.



A suggestion for the easy removal of cylinders.

There is no particular mechanical objection to this idea, but some method of ensuring that the unit can be replaced absolutely vertically would be necessary. The outside flywheel of a flat twin would need removal before the right-angle position could be reached, but generally it would not be necessary to turn the unit very far to facilitate the removal of the cylinders.

Developments in this direction are needed, and are worthy of consideration by many manufacturers; and, so far as can be seen, no drastic alterations to accepted design would be involved.

AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the figures for the preceding four weeks. Thus the general trend of the market is visible at a glance, though many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average, while in other cases advertisers miss many of the essential details, such as year of manufacture, h.p., etc.

Make.	Year.	H.P.	Average for last week	Previous weekly average.
A.B.C.	1914	3½ T.T. 3-sp. s'car	—	£70
A.J.S.	1916	6 combination ..	£97	—
„	1914	6 combination ..	£55	£56
„	1916	4½ 3-sp. sidecar ..	—	£90
Allon	1916	2¾ 2-speed	£30	—
Ariel	1914	5-6 sidecar	—	£55
Bat	1914	6 3-sp. sidecar ..	£47	£48
Bradbury ..	1914	4 2-sp. sidecar ..	£45	£34
Brough	1915	4 2-speed	£53	£49
B.S.A.	1916	4½ 3-sp. sidecar ..	£60	£68
„	1915	Model K sidecar..	£55	£58
„	1914	Chain 3-sp. sidecar	£55	—
Calthorpe ..	1915	2½ 2-stroke	£20	£25
Chater-Lea	1914	4 sidecar	—	£56
Clyno	1914	5-6 combination .	£65	£65
„	1915	2¾ 2-stroke	—	£22
Connaught .	1915	2-stroke 2-speed..	£35	—
Douglas ...	1916	2¾	£45	£55
„ ...	1915	2¾ T.T.	£45	£42
„ ...	1915	4 sidecar	—	£60
Edmund ...	1916	2½ spg. frame 2-sp.	£50	—
Enfield	1916	6 combination ..	£75	£70
„	1916	3 2-speed	£45	£40
„	1914	6 combination ..	£50	—
Excelsior ..	1915	4½ 3-speed	£40	—
„ ..	1916	2¾ 2-stroke	£20	£24
H.-Davidson	1916	Elec. combination	£86	£80
„	1915	Combination	£66	£70
Humber ...	1915	6 sidecar	£65	—
„ ...	1914	3½ sidecar	—	£35
„ ...	1913	3½ 3-speed	—	£28
Indian	1916	7-9 clutch model .	£55	—
„	1915	5 3-speed	£45	£42
„	1915	7-9 T.T.	—	£48
James	1916	4	£50	—
„	1916	2-stroke 2-speed..	£30	£30
Lea-Francis	1913	2-speed	£35	—
Levis	1916	Popular	£26	—
„	1916	2-speed	£30	£33
„	1915	2½ Popular	—	£22
Matchless ..	1915	7 combination ..	£75	£72
„ ..	1914	Model 8B comb'n	£60	—
Motosacoche	1915	3½ twin	£35	—
New Hudson	1916	2-speed 2-stroke..	£32	—
„	1915	3½ 3-sp. sidecar ..	—	£42
Norton	1916	3½ 2-speed	£49	£45
O.K.	1917	Junior	£40	—
P. & M. ..	1915	Combination	£58	—
„ ...	1914	Combination	£42	£57
Premier ...	1915	2¼ 3-speed	£28	—
„ ...	1914	3½ 2-sp. sidecar ..	£45	£42
Rover	1916	3½ 3-speed	£70	£79
„	1914	T.T.	£28	—
Royal Ruby	1916	2¾ 2-stroke	£29	—
„	1915	2¾ 2-stroke	£28	—
Rudge	1915	T.T.	£40	—
Scott	1916	Combination	—	£68
„	1915	Combination	—	£45
Sparkbrook.	1916	2½ 2-stroke 2-sp. .	£40	—
Sun-Jap ...	1916	4	£63	—
Sun-Villiers.	1915	2-speed 2-stroke..	£24	—
Sunbeam ..	1916	8 combination ..	—	£100
„ ..	1915	3½ combination ..	£75	£80
Triumph ...	1915	3½ 3-sp. sidecar ..	—	£44
„ ...	1914	4 sidecar	£40	£36
„ ...	1913	3½ T.T.	£33	—
„ ...	1915	Junior	£35	—
Williamson .	1913	8 combination ..	£30	—
Zenith	1916	8 combination ..	£68	£65

MOTOR-ASSISTED CYCLES.

FROM all parts of the world enquiries are coming in regarding the auxiliary motor attachments of which we have recently published particulars. An Australian officer of the 2nd Anzac Corps, Cyclists' Battalion, writes: "I am sure that such an engine would solve a problem which has had several of my brother officers and myself thinking pretty hard."

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address

YEAR OF ORIGIN.

Sir,—In reply to Mr. W. R. Weaver's letter in *The Motor Cycle* of March 8th, he would most probably find the year of origin stamped on the front fork spring, just by the main nut; also under the handle-bars, where the front brake rod enters. This is how my 1912 Triumph is marked.

B.T.C.

CONCESSIONS TO SERVICE MEN.

Sir,—Being a reader of your most interesting and instructive journal, I read with interest the article on the above subject. I have met several motorists, both in Naval and Military service, and the same feeling prevails amongst all. How one would enjoy a spin while on leave but cannot without taking out the licences for a few days only. For instance, I had two short leaves last year, and to be sure was longing for a spin on my mount but had to pay my visits to relations and friends by train, leaving my motor cycle standing idle.

A READER IN H.M. NAVY.

REMOVING REFRACTORY VALVE CAPS.

Sir,—I am sending you the following tip, which is not generally known, and which I think is worthy of publishing, viz.:

To detach a burnt-in exhaust valve cap, pour some cold water into the hollow of the valve cap, and then start up the engine. After it has run for about half a minute, the valve cap will come off quite easily, the reason being that, while the cylinder expands from the heat of the explosions, the valve cap is kept cool by the cold water. This method has never failed to loosen the valve cap, and saves the usual hammering.

ED. A. SMALL.

THE ENGINE AS A BRAKE.

Sir,—I have ridden a motor cycle for only eighteen months, and my experience tells me that closing the throttle with the engine in one of the gears is a powerful brake. I have gone down Birdlip, some of the worst descents in Cornwall and Devon, Countisbury, Porlock, and others round Snowdon, and I always use my engine as a brake, closing the throttle, and then, when necessary, adding the rear mechanical one next. Sometimes in descending a prolonged slope I start my engine in one gear for this very purpose. Incidentally, I open my air lever valve fully on occasion, but I perceive no difference in braking power with this action, the cylinder simply receiving supplies of cool air. Also I raise the exhaust occasionally in the descent, but I have not noticed any addition to the braking power. The very vacuum and compression with cushioning effect must surely retard the progress of the piston—as the impetus of the whole machine is trying to overcome compression—the exhaust lever in action destroying this compression. I should like a further understanding on this.

There may be an objection to this form of brake in the shape of unnecessary oil being forced past the piston rings and seriously increasing the carbon deposit, and, in a hilly country especially, accelerating the advent of cylinder removal for cleansing. Of this I am doubtful.

I believe, however, that in a hilly country with the sign of overheating and pre-ignition, leading to serious temporary loss of power, this latter can be avoided by descending hills with the engine running, throttle shut, air lever fully open (mine is a Binks), and possibly with exhaust valve open. It is an opportunity for rushing clean air through the cylinder and cooling the plug.

R. G. HOWARD.

SUBSTITUTES BY PERMIT.

Sir,—We see that in March 15th issue of *The Motor Cycle* is a statement that the control of substitutes has arisen, with a view to economising space in ships that would otherwise be used for food.

Is it not a fact that *all* substitutes, as well as *all* petrol, come to this country in tank steamers?

It would be interesting to know what purposes these tank steamers could be put to if released, as they are hardly suitable for the conveyance of anything else but fuel.

RIDER, TROWARD AND CO.
E. R. TROWARD.

[Tank steamers can, we are informed, be used for carrying grain. However, we see no reason why the use of home-produced fuels—such as some of the substitutes—should be curtailed. See our remarks, "The Ban on Petrol Substitutes," page 240 last week.—ED.]

SILENCER EFFICIENCY.

Sir,—In a recent issue you reported on the question of the efficiency of a silencer. The test applied in this case by the policeman was to poke a stick up the exhaust pipe, this proving the absence of baffle plates.

If the expansion chamber were in the form of a long tube, and a piece of wire gauze inserted in it, one would not be able to push a stick up it, yet I very much doubt if it would be passed by every, or even any, police officer.

Where can one draw the line between a noisy exhaust and a quiet one? As far as I am aware, there are no units in which to measure noise!

Are there any really definite rules about a silencer's silencing powers? If so, could some learned reader state them? My reason for writing is that I have found that the silencer of a certain 2¼ h.p. motor cycle only allows about four inches ground clearance. This space is insufficient for use over field tracks, and I wish to alter or remove the silencer.

Glasgow. J.H.M.R.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—*Re* the letters of "C.L.S." and John Bonython in the issue of the 15th inst., may I state that I lost my left eye at college due to a cricket ball. During the days of front-drive Werner and surface carburetters I started motor cycling, and up to five years ago, when I went to the wilds in South America, always owned some kind of motor.

As a constructional engineer, for one space of twenty months I never missed a single day riding to and from my work (fourteen miles), and often doing another twenty on the job.

I have never so far had a real smash, *i.e.*, enough to put myself or machine out of action for more than a day.

I, unconsciously, judge distances, say of approaching traffic, by comparing the moving object to some stationary point.

The cause of accidents, I consider, is either rashness, as Mr. Bonython says, or panic. At the sight of danger many hesitate or do the wrong thing first. It is just this fraction of a second that makes the difference.

My sense of hearing improved after my original accident, and I think you will generally find that nature supplies the partial loss of one sense by improving another.

I might add that I have heard that a considerable number of people actually use but one eye. R.E.G.

Whitley Bay.

SIDECARS FOR FIRE BRIGADES.

Sir,—The majority of the fire brigades in this country have yet to depend on horses, and in no small number of cases, in the less populous districts, upon manual labour, for hauling the fire engine and appliances to the scene of a fire. An apparatus which has been found to be a great acquisition in America, especially in towns which are dependent upon voluntary brigades, is a motor cycle with sidecar attachment, on which are carried several chemical extinguishers and other first-aid equipment. With this outfit it is not necessary to wait for the required number of firemen; one man can hop on to a motor cycle, get away smartly, and pick up aid *en route*.

It is said that, by its introduction, thousands of fires have been confined to their origins, viz., in curtains, couches, beds, mantel boarders, chimney fires, etc. The apparatus would be welcomed in this country, if manufacturers would put them on the market. Why, just imagine a heavy motor going to a slight fire, when a light one, such as I have mentioned, would suffice; and compare the costs. I am sure that motor cycles with sidecar attachments are just the thing. WILL GOODWIN.

RESTRICTIONS.

Sir,—As one of very many agents much interested, I should be glad if two statements could be made a little clearer—they seem to contradict each other.

The letter issued by the Ministry of Munitions states that we may buy motor cycles from makers, but may not sell them without a permit. The other paragraph on page 213 says, "There are to be no restrictions as regards the *use* of motor vehicles after March 31st."

Anyone having experience of the permit system knows how it has been used—and abused. It is sufficient to say that many *bonâ fide* applications have been refused, and many of the other sort granted.

The result of a regulation as indicated in the official letter would be to release the manufacturers' stock to the agents, and tie up agents' capital in motors they are not permitted to dispose of.

The permit system would need considerable revision if those agents are not to suffer who regard seriously such an undertaking as is required. J. H. WALLEN.

Dublin.

[The statements are not really contradictory, for the paragraph on page 213 refers to motor vehicles which are at present in the hands of the public, while the letter obviously refers to new unsold machines.—ED.]

REAR SPRINGING OF MOTOR CYCLES.

Sir,—I am much obliged for Mr. Pidcock's criticism of my article, and I agree with him that the amount of vertical movement necessary for absorbing road vibration is a debatable question, for it depends greatly on what the rider requires in the way of comfort and luxury.

For my part I do not see how any more than 2in. is required, for I would be content with springing at the rear equal to that obtained with a good design of front spring forks, and very few of them exceed 2in. in movement. The Scott, which is one of the most comfortable, does not exceed 1½in. Very few riders or even designers realise the amount of shock-absorbing quality a 2in. movement really has when properly designed and controlled. Still they all seem to know the difference in comfort between a soft and a "board-hard" tyre, yet in this the difference is seldom more than 1in. The problem is simply this; it is only in very exceptional cases that a greater movement than 2in. is required, and if you are to design your spring frame to meet such cases, you can only do so at the expense of strength, lateral rigidity, and neatness.

I have always considered the spring frame has suffered more from riders demanding excessive movement than from any other cause. One would think, considering they at present are nearly all riding rigid frames, that they would be content with a small movement at first, and gradually (as the difficulties were met) get increased comfort, etc., for they would still retain their present design of frame, with its strength and lightness, whereas to get a 6in. movement means a jointed frame and a rear wheel with no lateral stability.

I do not agree with Mr. Pidcock when he mentions the A.B.C. as having overcome the side strain question by continuing the compression forks upwards to the leaf springs. No matter what they do, the fact remains that the hinge behind the gear box must take all the strains.

Mr. Duncan's idea of a reducing gear is so complicated that I would not care to recommend its use.

JAMES MARTIN.

AIR V. WATER-COOLING.

Sir,—After trying both systems, I certainly think that a *properly designed* water-cooled engine is easily first as a no-trouble machine. In 1914 I used a 3½ h.p. water-cooled Humber (the most practical machine the company ever turned out). I worked it hard for a season, all sidecar work, covering some 4,000 miles, and during that time the valves were slightly ground in twice, neither valves nor springs (!) were changed, and the same plug was used. I then sold it to a friend near by, who ran it for a season about the same distance. During the whole time he had it the valves, rings, and plug were never touched, and when he gave up riding at the end of the season and sold it it was practically as good as new. Neither of us ever had a stoppage on the road owing to engine trouble!

The ideal sidecar machine, to my idea, should have water-cooled cylinders (like recent Scott machines), but an air-cooled *detachable* cylinder head and *valve pockets*. The water jacket of the cylinder should have fins cast on to assist in cooling, and this would allow a simple strong and *small* radiator to be used, thus getting rid of the only weak point in water-cooled machines—the honeycomb type radiator with its numerous holes and chances of leakage.

Another point in favour of water-cooling, not often referred to, is the fact that by filling the radiator with boiling water the engine can be easily started up in the coldest weather with the use of only an injection of petrol, *even when substitutes are used alone in the tank.*

My ideal engine for heavy sidecar work would be a water-cooled single of 1,000 c.c. with outside flywheel. This latter *not too heavy*, as it would then give too even a torque. Such a machine would give about as much trouble on the road as an ordinary brougham or hansom cab, and would last for many seasons, as any *practical* motor cycle should do.

The inside of the water jacket on any water-cooled machine should be thoroughly galvanised. Few motor cycle designers seem to understand that a mixture of water and iron produces rust (!) and rapid deterioration. It is necessary, of course, to use a *very thin* cylinder wall, and this, after a season or two, will rust through unless galvanised. Whenever a radiator is emptied a lot of rusty water and scale comes away, and it is obvious that no thin iron casting will stand this for long.

Mudguards, frame, forks, and rims should also be thoroughly galvanised, thus increasing their durability many times over. It should be just as absurd for a man to talk of buying a new machine every season as of buying a new lawn mower or sewing machine after twelve months' use. Perhaps after the war, when economy will be the order of the day, manufacturers will turn their attention to *durability* in their designs. M. HITCHCOCK.

THE PRICE OF THE MOTOR CYCLE RAISED TO 2d. FROM TO-DAY'S ISSUE.

Commencing with this issue the price of "The Motor Cycle" is increased to 2d. per copy.

The restrictions on the supply and the greatly increased cost of paper necessitate this step, but the old price of 1d. per copy will be reverted to as soon as circumstonces permit.

The subscription rates are correspondingly raised on renewal or to new subscribers:

British Isles, 10/10 per annum, post free.
All countries abroad, 15 2 per annum, post free.

All subscriptions current at the time of reducing the price to 1d. again will be proportionately lengthened for the benefit of each subscriber.

FLAT TWINS—A FEW QUESTIONS.

Sir,—The fact that the A.B.C. Co. and Mr. Bradshaw seem content with nothing less than perfection emboldens me to ask the latter a few questions.

However good its torque, an engine running at 5,000 to 6,000 revolutions per minute is suggestive of large oil and possibly heavy fuel bills. Is the cheap and easy replacement of wearing parts a feature of A.B.C. design?

Does Mr. Bradshaw consider that a transmission with only one direct drive, and (even three other) *fixed* ratios, is ideal, even for solo work? Of course, he cannot admire it on a *double*-purpose motor cycle!

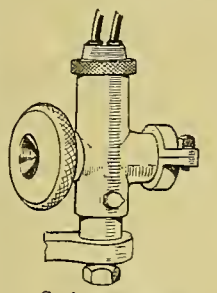
Would Mr. Bradshaw settle a small dispute? Is an *outside* flywheel, *on* the *driving side*, *essential* to a successful horizontal twin design?

Mr. D. C. Brown is hardly fair. I suggested that the *discussion* long *v.* short stroke was as well balanced as the Norton engine. H.K.P.

Liverpool.

A STRONG STARTING MIXTURE.

Sir,—While dismantling my Amac carburetter recently for cleaning purposes, it occurred to me that if I could contrive any means of admitting extra air between the jet and the small spray holes I could obtain a good strong mixture for starting and hill-climbing, because the air sucked through would contain a large percentage of petrol. So I removed an old spring lid oiler from a push-cycle hub, and screwed it into the barrel of the carburetter instead of the usual screw. The results justified the experiment. My 4 h.p. T.T single, geared 4¾-1, started in about two yards, whereas previously it had been very hard to start, and developed most unusual power. I do not need to flood the carburetter to start now. I simply open the oiler lid, turn on the petrol and push off. I hope this may be of use to your readers.



Spring cap oiler adopted in place of usual screw. (See letter M.M.K.)

North Berwick. M.M.K.

STARTING ON ACETYLENE.

Sir,—I note Mr. R. G. Lucas's letter dealing with acetylene gas and to its calorific value. We do know that acetylene gas explodes at a very low temperature; that is the reason we start so easily on acetylene gas, for a very faint spark is all that is required; whereas petrol gas requires a plump spark, which you do not get readily till you get speed up in most magnetos. Of course I would advise acetylene for starting up only, then shut the gas off and proceed on petrol. I tried this on a 2¾ h.p. Calthorpe-Jap in October of 1916. I bored a small hole in the induction pipe, put a small jet in this, and fixed the generator to the frame with a tube from generator to induction pipe. I then found out that it was impossible to run constantly on acetylene gas on an ordinary engine, because when the cylinder got to a certain temperature it caused pre-ignition, but I could start up easily on acetylene gas in a few yards. I also tried this on a 23 h.p. Darracq car, which started up easily. I wrote to Powell and Hanmer in the months of November and December of 1916 to supply this to the public at a nominal cost. It cost me 8s. 6d. to fix to the motor cycle.

I agree with Mr. Lucas in his statement that it does not become an explosive till it gets a good quantity of air, and in my estimation there is no danger so long as it is used for starting up purposes only. JOHN SPEEDIE.

Sir,—In *The Motor Cycle* of February 22nd I noticed a letter by Mr. Chidley, in which he seems to encourage the use of acetylene gas instead of petrol gas as the explosive for internal combustion motor cycle engines. Mr. Chidley will, I am confident, be disappointed if he attempts to use this gas. The efficiency of an internal combustion engine depends, not only on the correct mixture of the compound being present, but also on the rate at which that compound explodes. Some explosives explode in far less time than others. In an internal combustion engine, in order to obtain the greatest efficiency, it is necessary for the expanding gases to have given the piston nearly all the power they possess when the exhaust valve opens. If the gases explode at too great a rate nearly all their power will be used up during the first part of the down stroke of the piston, the piston during the rest of the power stroke travelling practically by its own momentum.

On the other hand, if the gases explode too slowly then the full pressure on the piston will not be reached at all until the exhaust valve opens; thus, a considerable portion of power will be wasted by rushing aimlessly out of the exhaust.

Acetylene explodes at a considerably greater rate than petrol, and, consequently, although there is no danger in using it largely diluted, if it is carefully handled, it will never be of any practical use in an internal combustion engine, except perhaps to make the engine fire on a cold morning.

I have read Mr. Lucas's article in which he asks Mr. Lees to state a single case in which the top of the cylinder has been blown off through the use of acetylene gas in an internal combustion engine. I personally know of a case in which two skilled motor engineers were testing acetylene gas in a gas engine, and a hole was blown through the piston. In this case, if the cylinder walls had been more of the frail nature of motor cycle cylinders they would undoubtedly have burst.

I may, in addition, say that I totally agree with Mr. Lees when he advises the discontinuance of the numerous experiments which are at present being conducted by many motor cyclists on the efficiency of acetylene gas as the explosive in internal combustion engines. Personally, I consider that more profitable results would be obtained if an attempt were made to utilise coal instead of acetylene gas as the explosive for internal combustion engines.

Cambridge. PRACTICAL MOTORIST.

LONG V. SHORT INLET PIPES.

Sir,—I have noted with interest the correspondence *re* above, in particular Mr. Bradshaw's statement that a long inlet pipe suitably heated is an advantage. He also stated that carburetter manufacturers mention this point in their catalogues. I should be glad to know *which* carburetter manufacturer makes this statement, as—although I have most of their catalogues by me—I have failed to find any such statement.

The Zenith Co. say, "It is an advantage to have a length of vertical pipe immediately above the carburetter of 3in. or 4in. long, but the inlet pipe *should not be too long, as this affects the slow running* and pick-up qualities, and causes condensation (? deposition) to occur."

This does not surely bear out Mr. Bradshaw's statement. Again, the Longuemare-Hardy carburetter catalogue states, "Fix an induction pipe with vertical lead of about 3in. above the carburetter." Nothing further is said about the *length* of the pipe.

Some years ago I fitted a long inlet pipe to a 3½ h.p. Humber engine, but decided, after a long trial, it was a disadvantage. The pipe was not heated except by conduction from the engine, but this was not necessary, as it was very hot weather at the time.

Just recently I fitted a 12in. long induction pipe to a small V twin water-cooled car engine, all the air being taken from the exhaust pipe. Formerly, as short an induction pipe as possible was used, and the carburetter was not heated in any way.

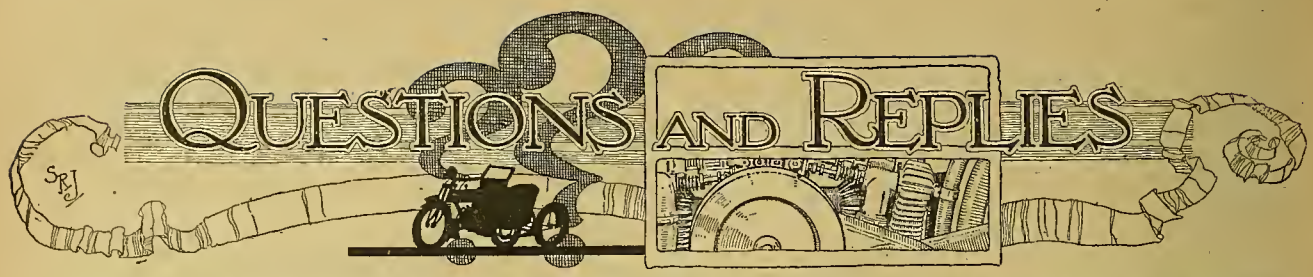
In this case also I find the motor is not so flexible as formerly, and does not pull so well at slow speed. Moreover, I had slightly to enlarge the jet. I should mention that all joints are faced joints and absolutely gas-tight.

The B. and B. and Amac people say the inlet pipe should be as *short* as possible, and my experience leads me to endorse this.

I should be glad to know if Mr. Bradshaw has *proved* conclusively that a long pipe *is* an advantage, and, if so, on what counts; and if any other readers have made experiments on this point, I think they would prove extremely interesting. L. WALLACE.

SUMMARY OF CORRESPONDENCE.

Mr. E. Percival Boys writes in praise of Petrolior, from which he has obtained excellent results on a Triumph motor cycle without any alteration whatever to the induction system.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C., 4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

More Betting.

To settle a bet, will you please tell me whether V.T.S. stands for Villiers two-stroke or Vitesse two-stroke?—H.H. (B.E.F.)

V.T.S. stands for ViTeSse.

Pre-ignition.

I have a 2½ h.p. single-cylinder four-stroke, which will run beautifully for about five miles, and then it begins to "konk out" and stops, gets very hot, and smoke comes out of the air inlet of the carburetter. If I leave it for about fifteen or twenty minutes it will start again quite easily, but will stop again after another five miles. Can you tell me the reason of this? How can it be cured? If it wants a new sparking plug, what kind should I get?—L.B.W.

The trouble is probably due to the use of an unsuitable plug, the points of which project too far into the cylinder and cause pre-ignition. A plug which has wide and substantial points should be most suitable. You might also try running the engine on a smaller jet.

Gears and Cogs.

Although I am a mechanic, I am rather puzzled over gear work, how to work it out. For instance, in the case of a 35-tooth gear, what diameter should the wheel be at ¼in. pitch? Also if I had a blank of given diameter to cut to a given pitch, how should I find out the number of teeth? What depth is a cycle cog cut?—A.C.

We take it that you require (1) the pitch diameter, and having given the circular pitch and number of teeth, (2) the number of teeth, having given the pitch diameter and circular pitch, and (3) the whole depth of a tooth. The following are the formulæ:

(1.) $D = NP \times .3183.$

(2.) $N = \frac{D \times 3.1416}{P}$ or $\frac{D}{P \times .3183}$

(3.) $\text{Depth} = P \times .6866.$

D = Pitch diameter.
P = Circular pitch.
N = Number of teeth.

In the case of 35 teeth of ¼in. pitch, the pitch diameter will work out as follows:

$D = NP \times .3183 = 35 \times .3183 \times .25 = 2.785.$

The outside diameter will be:

$D + (P \times .6366) = 2.944.$

Petrol Substitutes.

In view of the coming scarcity of petrol, I should be glad if you would give me a few hints on the most advantageous methods of using substitutes in a motor cycle engine.—J.S.L.

The employment of petrol substitutes on motor cycles is a matter on which it is somewhat difficult to generalise. A good deal depends upon the design of the machine in regard to such matters as the length of the induction pipe and the facilities provided for heating the carburetter or the air entering it. On the whole, however, petrol substitutes are more easily employed on motor cycles than on cars, because the engine of a motor cycle almost invariably runs at a considerably higher temperature than that of a water-cooled motor of a car. Even on a motor cycle it is, of course, necessary to obtain the initial explosions by means of some fuel lighter than the ordinary petrol substitute, unless before a start is attempted the induction pipe be warmed by some such apparatus as a blow lamp. The heating of the induction pipe to a fairly high temperature will generally result in the production from the petrol substitute spray passing through the pipe of an inflammable vapour, which will be fired by the spark at the plug points. If this artificial heat can be maintained until the cylinder itself becomes thoroughly warmed the subsequent running on several of the substitutes will not present any insuperable obstacle. More satisfactory results, however, will be secured by mixing a certain proportion of petrol with the substitute, anything from one-third to one-half petrol having been found quite suitable. When using petrol substitutes, practically all of which are of a considerable higher specific gravity than petrol, it is, as a rule, desirable slightly to weight the float so as to bring up the fuel in the jet to the normal level. It is also well to provide for a very rich mixture for starting, and to have a wide range to the air supply for the mixture. It is frequently found that until the engine becomes thoroughly hot it is necessary to run with a mixture more rich than is required with petrol; but, subsequently, the air supply can be increased to the normal, or even slightly beyond. In some cases, those who sell petrol substitutes advocate the use of a slightly smaller jet than is employed with petrol; but, in our opinion, it is preferable to maintain the standard jet size and admit more air.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

Magneto Trouble.

I am "up against" a difficulty which is puzzling all the local experts, and out of which no way has yet opened up. My magneto (Bosch) refuses to give spark when geared up with engine, but when detached, or put out of gear, and turned by hand, it sparks splendidly. It has recently been overhauled, and gaps and brush are according to all the received text-books. One would almost think that a circuit was being made through gearing.—W.J.R.

A magneto cannot be short circuited by its drive, and we can only suppose that the bearings are worn and the pull of the drive causes the armature to touch the pole pieces, or that the gap is so small that it is only effective at low speeds.

Timing the Spark.

The makers of my engine—a 6 h.p. J.A.P.—state in their booklet that when timing the spark the piston should be turned $\frac{7}{16}$in. back from the top dead centre when the points are in the act of breaking, and that this allows the spark to travel to the top of the cylinder, so that it actually occurs when the piston is just going over the top of the stroke, and that the spark lever must be *fully advanced*. Now I was taught that the lever should be *fully retarded*, or at the outside never above *half advanced*. I should be obliged if you would inform me if this is correct, and why.—J.S.

As to whether the lever should be fully advanced, fully retarded, or halfway retarded depends upon the point at which the piston is set. If the spark lever were retarded with the piston in the position given, then the spark would occur too soon when the lever was advanced and cause a back-fire. If, however, the points are timed to break when the piston is at the top of its stroke, then the lever would be retarded.

The Weight of Paraffin Vapour.

(1.) How much heavier than air is paraffin vapour, if any? (2.) What proportion of air to paraffin gas makes the best combustible mixture for internal-combustion engines? (3.) Is there any liquid which can be added to paraffin to make it more combustible other than petrol and such like spirits?—R.W.

(1.) At normal pressure and normal temperature paraffin vapour is about 2.6 times heavier than air. (2.) Roughly speaking, about 14 to 1. (3.) Alcohol, methyl-alcohol, and other materials of the alcohol family may be added to paraffin to make it more combustible.

Care of Accumulators.

I am riding a 1916 7 h.p. electric Indian. I purchased at the same time a spare battery and had it charged up ready, so that, if that fixed on the machine should fail, I should not be hung up. This, however, has not yet happened in six months' usage, so that I have not yet had occasion to use the "spare." I have, however, to keep getting the "spare" recharged every three or four weeks, as it runs down. To avoid this I propose fixing it to the sidecar frame and connecting it to the battery already in use, so that the dynamo will charge and keep in trim both batteries at the same time. Do you advise this? Each battery is six volts fifteen ampères. I presume the capacity will be thirty ampères when both are connected.—G.A.R.

We think your best plan will be to change over the batteries every week or so rather than to expect the dynamo to charge both at the same time. If the batteries are connected in series the voltage will be raised to twelve; if in parallel, the ampèrage to thirty.

Petrol and Permits.

I am the holder of a small stock of petrol which I obtained under permit last autumn, and which, by careful husbanding, I have been able to save, and wish to use when the fine weather comes along. Could you kindly inform me whether, in view of petrol permits ceasing this month, I shall be debarred from using the petrol I have saved? I have heard rumours to this effect, and, as a constant reader of your valuable journal, it has occurred to me that you could throw some light on the matter. Further, what would be the position of a person who accepted petrol—purchased under permit and which the purchaser found he could not use—from a friend? Is the accepting person entitled to use such petrol notwithstanding he does not hold a permit?—ANXIOUS TO KNOW.

There is no restriction which could in any way interfere with your using what petrol you have in stock. You are perfectly at liberty to sell any small stock of petrol you may have in hand on which you have paid duty to a friend, and there is no date fixed at which further petrol must not be used. The main object of the new restriction is not to prevent motoring, but to save petrol for naval and military requirements and to economise tonnage.

H.P. for a Monocar.

I am building a light monocar, weight 2 cwt. Will you kindly tell me: (1.) If you think a 5-6 h.p. twin will carry me up ordinary main road hills on a gear of 4½ to 1? (2.) Can I slip a cone clutch to take the place of lowering the gear? (3.) Can I obtain tyres of 3in. section to fit rims of 2in. section?—H.H.B.

We should recommend you to have an 8 h.p. engine if possible. The machine will be quite hopeless with a single gear. You cannot slip a clutch indefinitely; trouble is sure to ensue, and probably very quickly. No, the largest tyres you can fit to 2in. rims are 2½in.

The Largest Motor Bicycle.

Can you inform me what is the largest motor cycle ever ridden in Great Britain? A friend and I have had an argument.—G.R.

The largest motor cycle ever ridden in Great Britain, to the best of our knowledge, was the 16-20 h.p. N.L.G.-J.A.P., which had a bore and stroke of 120×120 mm. It was ridden at Brooklands by W. E. Cook, but its paces were not extraordinary.

Gear Ratios.

I have purchased a new 1916 4¼ h.p. B.S.A., three-speed countershaft gear, kick starter, chain-cum-belt drive; a No. 1 B.S.A. sidecar, with hood and screen, luggage carrier, fitted to the machine. It will have to carry myself, wife, and child, aged two years, and will be called upon to climb a real 1 in 4 gradient, for certain, at times. I do not intend to exceed a speed of 25 m.p.h. on top gear at any time, more especially as I wish greatly to reduce the whole range of gear ratios. This is done by changing engine sprocket wheel only. My two questions *re* reducing the gears: (1.) Present gears are: Engine-shaft wheel, 14 teeth; gear box, teeth 35, pulley 7⅝in.; back hub rim, 16½in.; gear ratios, high 5.3, medium 8.5, low 13.5. I am going to fit a twelve-tooth sprocket wheel. What will be the range of gear ratios through dropping the two teeth on the engine sprocket wheel? (2.) Do you consider that driving the outfit with full load very moderately on the lower gear ratios proposed, and giving a very liberal supply of oil, would do the engine any great harm? My aim is to get a low bottom gear of at least 15 to 1.—W.E.

(1.) The twelve-tooth sprocket will give you gears of 6.2, 9.9, and 15¾ to 1. (2.) No harm will result to the engine if you drive carefully

DELAYS IN POSTAL DELIVERIES.

In view of depleted staffs, the curtailment of railway services, and the consequent delay in delivery of mails, readers will greatly assist by forwarding communications (including advertisements) as much as possible in advance of the dates of the issues for which they are intended.

Magneto-lighted Lamps.

Could you tell me where the magneto wire of the F.R.S. magneto set should be attached? My friends tell me it fastens on top of the sparking plug, but then they are as green as myself!—A.H.S.

The wire should be attached to the magneto switch or cut-out terminal.

EXPERIENCE WANTED.

"M.W.M." (Mold).—Grado vaporiser.

READER'S REPLY.

Slip in an Enfield Gear.

In connection with several letters I have seen recently in *The Motor Cycle*, relative to slip in Enfield gears, and the method of withdrawing the sliding pinion and cam, perhaps the following may be of interest, it being founded on five years' continuous ownership of an Enfield gear: *To withdraw the sliding pinion and com.*—(1.) Remove the plated hexagon end-cap on the thrust bracket, and turn the gear lever into *and past* the low gear position as far as it will go. *To do this first is the secret of the whole thing.* (2.) Lift off the gear lever and remove the six (or four) securing screws of the thrust bracket, also the nut from the arm. (3.) Take off the thrust bracket and the sliding pinion, and the cam can now in variably be pulled out with the fingers with the greatest ease. *To diagnose cause of slipping.*—If *high gear slips before low*, the trouble is with the slipping clutch on the engine-shaft. If *low gear slips before high*, it is in the gear on the countershaft. A few minutes' thought will soon show why this is so. It is merely a matter of leverage and wear.—A. W. PHILLIPS.

RECOMMENDED ROUTES.

ST. ALBANS TO STOURBRIDGE.—L.P.

St. Albans, Berkhampsted, Tring, Aylesbury, Bicester, Ampthill, Banbury, Ettington, Stratford-on-Avon, Alcester, Headless Cross, Bromsgrove, Bell End, Stourbridge.

BRISTOL TO NORTHAMPTON.—M.M.

Bristol, Fishponds, Tormarton, Acton Turville, Malmesbury, Cirencester, Burford, Chipping Norton, Deddington, Aynho, Brackley, Towcester, Northampton.

BIRMINGHAM TO PETERBOROUGH.—F.S.

Birmingham, Stonebridge, Coventry, Brinklow, Pailton, Lutterworth, Husbands Bosworth, Market Harborough, Wilbarston, Weldon, Oundle, Elton, Peterborough. Approximately 85 miles

PENZANCE TO ULVERSTON.—R.J.

Penzance, Hayle, Camborne, Redruth, Zelah, Mitchell, Bodmin, Launceston, Okehampton, Crediton, Exeter, Cullompton, Wellington, Taunton, Bridgwater, Highbridge, Redhill, Bristol, Gloucester, Tewkesbury, Worcester, Kidderminster, Bridgnorth, Wellington, Hodnet, Whitchurch, Tarporley, Warrington, Wigan, Preston, Garstang, Lancaster, Milnthorpe, Hall, Kendal, Newby Bridge, Ulverston.

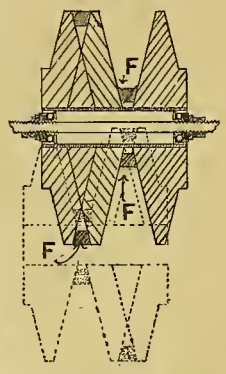
PATENTS

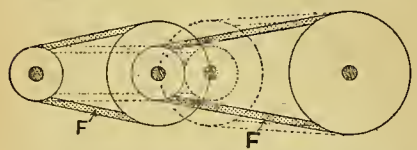
BY

ERIC W WALFORD.

Variable Pulley Gearing.

This is a gear of the type in which two belts F are used, one driving from the source of power to a countershaft and the other from the countershaft to the driven element, which, of course, would be the back wheel in the case of a motor cycle. In the present construction the countershaft is in the form of a hub running on ball bearings on a spindle, which may be moved backwards and forwards between the extreme pulleys in order to vary the gear, a slight oblique movement being provided at the same time to maintain the alignment of the belts. The countershaft carries two outer fixed flanges and also a sliding inner flange, and it will be understood that,



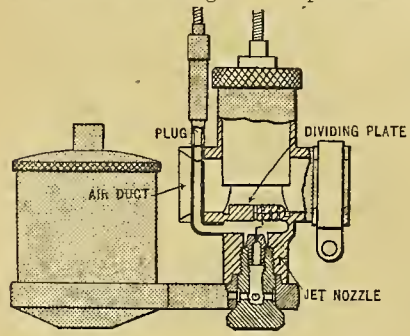


as the countershaft is moved to vary the tension of the belts, the latter will rise and fall in the grooves, providing a variable ratio.

The specification also describes modified constructions in which three or more belts are used, but presumably these would not be suitable for application to motor bicycles.—C. H. Wilkins, No. 17,872, 1915.

Carburetter Development.

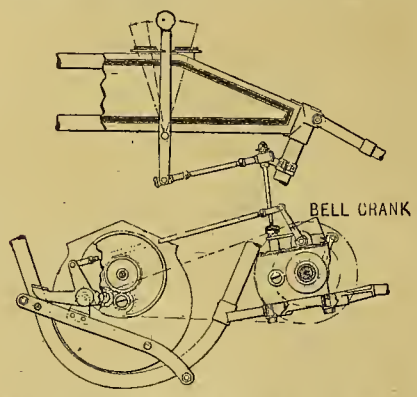
In the carburetter here illustrated the jet outlet is below the level of the fuel in the float chamber, so that when the engine is not running the fuel overflows and fills the space above the jet. The cut-off takes place before the fuel rises above the dividing plate, which is provided with perforations leading to the passage through the carburetter. Leading to the space above



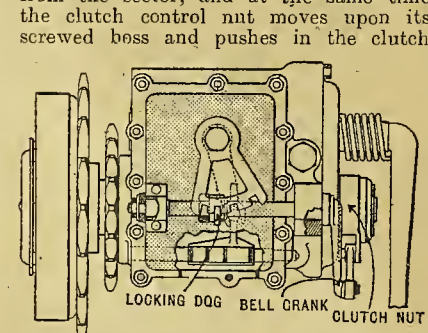
the jet is a duct which supplies air, an adjustment for this being provided by means of the plug at the upper end of the duct, this plug being actuated by a Bowden wire. It will be seen that the petrol which overflows will provide a rich mixture at starting, whilst in ordinary running the fuel is consumed at such a rate that there is no accumulation in the space beneath the dividing plate. Further, the air passing through the duct travels immediately over the jet outlet, so that efficient vaporisation is effected.—E. Hutchinson, No. 103,847.

Gear Control Improvement.

The drawings illustrate a construction in which it is impossible to change gear without first taking out the clutch, so that the gears are never under load at the moment of changing. The clutch rod passes through the countershaft, and is operated by a nut which screws upon a boss on the gear box. The nut is actu-



ated through a bell crank lever connected by a rod to the clutch pedal. The spindle of the bell crank lever carries a locking dog, which engages recesses in a sector carried by the gear changing mechanism, the latter being connected up to the control lever by the link mechanism shown in the side view. The arrangement is such that when the clutch is in engagement the locking dog projects into one of the recesses in the sector, so that the gear slider cannot be moved. When, however, the clutch lever is depressed the spindle of the bell crank is rotated so that the locking dog is disengaged from the sector, and at the same time the clutch control nut moves upon its screwed boss and pushes in the clutch



rod, freeing the clutch. The gear changing mechanism is now free to be operated, after which it is again locked when the clutch is engaged. Further details of the construction are given in the patent specification.—F. B. Dehn (Harley-Davidson Motor Co.), No. 103,580.

SPARKLETS

Business Names.

"Guide to the Registration of Business Names Act" (Kenneth Brown), Sir Isaac Pitman and Sons, Ltd., 1, Amen Corner, London, E.C., 1s. In concise form this booklet explains the Registration of Business Names Act, which was briefly referred to in *The Motor Cycle* of March 1st.

Tyre Prices.

Owing to the rise in prices of raw materials, Messrs. W. and A. Bates, Ltd., St. Mary's Mills, Leicester, have found it impossible to maintain the reduced prices in force at the beginning of the year, and their motor cycle covers from March 1st were therefore advanced 15% and their tubes 10%.

Harley-Davidson Motor Co.

A small brochure is to hand from the Harley-Davidson Motor Co., 74, Newman Street, London, W., in which full particulars of the 1917 7-9 h.p. twin and sidecar are given, together with details of the Remy electrical ignition, lighting, and warning system. The booklet is well furnished with half-tones, and is a useful and artistic production.

700 × 75 mm. Palmer Tyres.

The Palmer Tyre Ltd., 119-123, Shaftesbury Avenue, London, W.C., inform us that they are now in a position to supply 700 mm. × 75 mm. ribbed combination and steel-studded tyres, and also the Palmer Cord 26×3in. ribbed tyre, as they have a small stock at their disposal. This matter should be of interest to riders of high-powered sidecar combinations.

Flexible Copper Tubing.

We have received a sample of excellent copper flexible tubing from the Service Co., Ltd., 289, High Holborn, London, W.C. It is made in various thicknesses and in many sizes. The sample sent to us is a $\frac{1}{4}$in. × $\frac{5}{16}$in., and is sold at 9d. a foot. There is considerable difficulty at present in obtaining standard copper tubing, and the flexible type, of course, possesses some advantages over the latter. Motor cyclists will be glad to know that the Service Co. are able to supply this useful adjunct.

The Cycle and Motor Trades Benevolent Fund.

We are in receipt of the annual handbook of the Cycle and Motor Trades Benevolent Fund, of which Mr. A. J. Wilson is general hon. sec. and treasurer. There are not many changes indicated, except for those which show the Fund's steady growth even during the present crisis. Last year the assets exceeded £23,000, and now they exceed £28,000, while three new branch centres have been established. The names of some 500 members and subscribers who are serving, or who have served, with H.M. Forces, are marked with an asterisk.

A LEAK of £2,423,865

STATISTICS go to show that during 1916 the above enormous sum of money went out of Britain in the purchase of tyres imported from countries taking no active part in the war. And in the first month of the following year a new war loan is floated.

In such a crisis, when the 'might of the million' means so much towards ultimate victory—while every inch import freight space is required for victory essentials—FOOD and MUNITIONS—*should* victory essentials give place to unneeded *tyres?* Should another two and a half millions sterling leak away from Britain's financial resources during 1917?

UNHESITATINGLY NO!

British tyre manufacturers are in a position to supply all requirements, government, commercial and private. Help to stop the leak by purchasing only British tyres, and so support British financial stability by supporting British industry.

Remember, not all tyres with British-sounding names are British, but the adjoining list, although not complete, affords you a choice of fifteen all-British products.

ALMAGAM	KEMPSHALL
AVON	LEYLAND
BATES	MACINTOSH
BELDAM	MIDLAND
NORTH BRITISH	MOSELEY
CLINCHER	PALMER
DUNLOP	SPENCER-MOULTON
HENLEY	WOOD-MILNE

I SUBMIT there

is a solid reason why you should adopt a

BINKS CARBURETTER, viz.:

YOU CUT YOUR FUEL BILL IN TWO

if you adopt my system and use my fuel. You can, of course, use petrol or benzol without alteration.

Price of Carburetter complete—

49/-

plus 10% extra war cost.

Fit any Machine

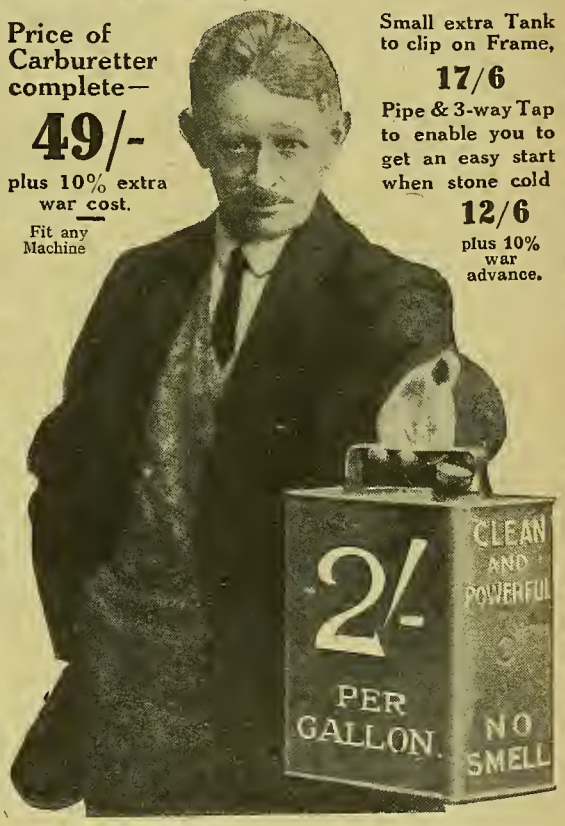
Small extra Tank to clip on Frame,

17/6

Pipe & 3-way Tap to enable you to get an easy start when stone cold

12/6

plus 10% war advance.



READ!

MY 3-PHASE JET DAMPING CARBURETTERS

have such perfect vaporising properties that they enable you to use fuel at **2/-** per gallon in 42-gallon casks, which you are allowed to keep on your premises. Casks **12/6** extra, returnable at **10/-** each, less ½d. per gallon rebate to users of the "Binks" Carburetters purchased within the last two years. Your engine will tick over dead slow, and pull dead slow in traffic, yet give the full power. It is almost impossible to tell you are not running on petrol at **3/-** a gallon. It cannot damage your engine or soot it up, and makes Motor Cycling possible in these times.

I give you my personal assurance of the truth of what is stated above. Please send at once for full particulars of the carburetter, and also for my Treatise on Carburation, and terms of One Month's Approval Trial.

Agents for London:
Messrs. OYLERS, LIMITED,
35, New Cavendish Street, W.

C. BINKS, Ltd., Eccles.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every wo words after. Each paragraph is charged eparately. Name and address must be counted. eries discounts and special terms to regular rade advertisers will be quoted on application.

Postal Orders sent in payment for adver-isements should be made payable to _____ & Co. LIFFE & SONS Ltd., and crossed _____

All advertisements in this section should be ccompanied with remittance, and be addressed o the offices of "The Motor Cycle," Hertford treet, Coventry. To ensure insertion letters hould be posted in time to reach the offices of 'The Motor Cycle,'' Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday norning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken o avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed, 'No. 000, c/o 'The Motor Cycle,' 20, Tudor St., E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged, when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

ABINGDON King Dick, 5-6h.p. twin, 2-speed countershaft, chain-cum-belt, just been overhauled; must sell; £30.—27, Woodbridge Rd., Moseley, Birmingham. [X8179

A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [X7098

A.J.S., 6h.p., 1916, and sidecar, practically new, every accessory possible; £95.—Mackness, Chippenham. [9633

1915 (Nov.) 2¾h.p. A.J.S., sporting model, 2-speed, clutch, lamps, mechanical horn, spares, little used, and tyres good; 42 gns.; also see New Imperial.—Hillary, The Peak, Basingstoke. [X8041

A.J.S., 6h.p., 1914, engine, wheels, forks 1915-16 pattern, Gloria coachbuilt S.C., patent screen, Bioks carburetter and spare tank, 3 Lucas lamps, Xl'all saddle, tools, spares, accessories, all renovated by makers 1916.—Forshaw, Hill House Hotel, Handsworth Wood, Birmingham. [X8112

Alldays.

ALLON, 2-speed, 1916, lamps, horn, fine condition; £35.—English, Newark. [X8109

1915 Allon, 2¾h.p., 2-speed, E.I.C., Sensprav; 25 gns.—Railway Garage, Staines. [9869

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

EASTERN GARAGE

NEW MODELS FROM STOCK.

ALLON, 2-stroke, 2-speed ..... 42 gns.
B.S.A., 4¼ h.p., 3-speed, chain drive ... £66 0
B.S.A., 4¼ h.p., 3-speed, Model K £64 0
CALTHORPE, 2-stroke, 2-speed ..... 33 gns.
CALTHORPE-J.A.P., 2¾ h.p., 2-speed .. 38 gns.
ENFIELD, 2-stroke, 2-speed ..... 42 gns.
ENFIELD, 3 h.p., twin, 2-speed ..... 55 gns.
ENFIELD 6 h.p. Combination ..... 90 gns.
ENFIELD 6h.p. Combination, with Lucas dynamo lighting set ..... 105 gns.
JAMES, 2-stroke, 2-speed £42 0
JAMES, 3½ h.p., twin, 3-speed £69 0
JAMES 4¼ h.p. Combination £86 0
LEVIS Popular, 2½ h.p., 2-stroke £32 0
NEW IMPERIAL, 2½ h.p., 2-speed .... 39 gns.
NEW IMPERIAL, 2½ h.p., 2-sp., clutch and kick starter ..... 46 gns.
ZENITH-GRADUA, 3½ h.p., twin £62 0

EXCHANGES.

We specialise in exchange transactions, and will allow full value for your old Motor Cycle or Light Car in part payment for any new one.

"Second-hands."

The following is a selection from our large stock of machines of all types:

ROYAL ENFIELD 1916 6 h.p. Combination, 3 Lucas lamp sets, Cowey speedometer, mechanical horn £78
CLYNO 1914 6 h.p. Combination, Lucas electric lighting set, speedometer £65
JAMES 1915 2½ h.p., 2-stroke, 2-speed, Lucas lamp set, rear lamp, and horn .. £32
ALLON, 1915, 2¾ h.p., 2-stroke, 2-speed .. £32
MATCHLESS, 1913, 8 h.p., 2-speed, clutch, and kick starter, all accessories, and Gloria spring wheel Sidecar £45
ZENITH, 1913, 3½ h.p., Gradua gear £30
CALTHORPE, 1915, 2¾ h.p., 2-stroke, 2-sp., head light, rear lamp, horn £27
DOUGLAS, 1915, 2¾ h.p., War Office model £46
TRIUMPH, 1914, 4 h.p., 3-speed £40
JAMES, 1916, 2¼ h.p., 2-stroke, 2-speed, lamps, and horn £36
DOUGLAS, 1910, 2¾ h.p., lamps, and horn £15
CALTHORPE-J.A.P., 1915, 2¾ h.p., 2-speed, lamps, and horn £30
NEW IMPERIAL-J.A.P., 2¾h.p., T.T. model, 2-speed, Cowey speedometer £35
ALLON, 1916, 2¾h.p., 2-stroke, 2-speed, Lucas lamps and horn £38
ALLON, 1915, 2¾ h.p., 2-stroke £25
CALTHORPE-J.A.P., 1915, 2¾ h.p., 2-speed £27
TRIUMPH, 1912, 3½ h.p., Bowden countershaft 2-speed gear, clutch, and kick start £28
MATCHLESS 1915 7 h.p. Combination, 3-sp. and clutch, M.A.G. engine, Lucas lamp and horn, speedometer, and watch £73
RUDGE, 1913, 3½ h.p., 2-speed, lamps, horn, mirror, Phœnix coach-built Sidecar ... £34
J.H., 1915, 6 h.p., M.A.G. engine, countershaft 3-speed gear, clutch, and kick start £48
IXION 1916 Light Combination, coach-built, 3-speed, clutch, and kick starter £45

Deferred Payments accepted for either New or Second-hand Goods.

Eastern Garage Co.,

Official Repairers to R.A.C., A.C.U., A.A., & M.U.,

418, Romford Rd., Forest Gate, E., 7

Telephone: 490 East Ham.
Telegrams: "Egaraco, London."

IMPORTANT NOTICE.

Owing to the Easter Holidays, the issue of "The Motor Cycle" for April 5th must be closed for prese earlier than usual. All copy and instructions for Miscellaneous Advertisements in that issue must, therefore, be in our hands not later than first post on Thursday, March 29th.

MOTOR CYCLES FOR SALE.

Alldays.

ALLDAYS Matchless, 3½h.p., 3-speed, £25; coach-built sidecar, £4.—Johnson, 61, Osborne Rd., Acton. [9840

ALLDAYS Matchless, 1915, 4½h.p., 3 speeds, tyres good; £25.—Gooch, Norwich Rd., Wymondham, Norfolk. [X8113

ALLONS.—1917 2-speed models for immediate deliveries; £44/2.—Jones, Garage, Broadway, Muswell Hill. [9885

NEW Allon 2-stroke Models from stock, 2-speed gear; £42; exchanges and easy terms arranged.—Wauchope's, 9, Shoe Lane, London. [9780

RIDER TROWARD'S, 78, High St., Hampstead.—1917 Allon de Luxe, spring frame model, cost over £50, run 100 miles, runs on neat paraffin; 43 gns. [9829

ALLON.—All 1917 models in stock, 36-45 gns.; exchanges and deferred payments arranged.—Maudes', 100 and 136 Gt. Portland St., London, W. Tel.: 552 Mayfair. [7387

ALLDAYS Allon, late 1915 model, 2-stroke, 2-speed gear, good condition, not used since joining army last June, £34; also lamp, rear lamp, generator, 15/-.—A. W. Watts, Northallerton. [9672

Ariel.

ARIEL, 3½h.p., 1917, 3-speed countershaft models, in stock.—Crow, Bros., Guildford. [9211

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

1915 Ariel, 3-speed countershaft, all accessories, in splendid order, good tyres; £45.—Henly, 7, Woburn Place, W.C. [9809

1913-14 Ariel, 3½h.p., C.B. sidecar, Armstrong's 3-speed gears, good running order; £30.—Dutton, 2, Botany Bay Rd., Sholing, Southampton. [9804

3½h.p. New 1917 Ariels from stock; 3-speed countershaft gear models, price £65; easy terms or exchange arranged.—Wauchope's, 9, Shoe Lane, London. [9782

ARIEL, the reliable motor cycle, 3½h.p. single, and 5-6h.p. twin models; delivery from stock.—Colmore Depots, 211, Deansgate, Manchester, and 31, Reoshaw St., Liverpool. [0889

ARIELS.—1917 5-6h.p. combinations and 3½h.p. combinations for immediate deliveries; cash, deferred, or exchanges with up-to-date machines, Douglas preferred.—Jones, Garage, Broadway, Muswell Hill. [9886

Auto-Wheels.

AUTO-WHEEL, 1914, in good condition; £6/10, or exchange.—Pounder, Percy St., West Hartlepool. [X8062

Bat.

4h.p. Bat-Jap and sidecar, mechanically new; £18.—Pittuck, Railway Station House, East Ham. [9653

1914 6h.p. Twin Bat, 3-speed countershaft gear, coach sidecar; £46/10.—Motor Exchange, Horton St., Halifax. [9463

BAT, 8h.p. T.T., just thoroughly overhauled, new bushes throughout, mag. remagnetised, new valves and valve levers, good tyres and enamel; trial run; owner in France.—Sgt. Strand, Hingham, Norfolk. [X8064

Bradbury.

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage; £49/10.—Motor Exchange, Horton St., Halifax. [9445

BRADBURY, 3½h.p., coachbuilt sidecar, N.S.U. 2-speed gear, tyres as new; £18/10.—192, Westbourne Grove, W. [9811

1913-14 Bradbury, 4h.p., 2-speed, excellent condition, will run on petrol substitutes; £19.—Gillham, Midhurst, Sussex. [9849

BRADBURY, 1912, 2-speed, 4h.p.; £22/10; deferred terms if desired.—Lamb's, 151, High St., Walthamstow, E.17; also at 50, High Rd., Wood Green. [9833

BRADBURY, 1913, 4h.p., and sidecar, splendid condition, N.S.U. 2-speed gear, all on; 30 gns.—Particulars, Rogers, Newington Terrace, Craven Arms, Salop. [9753

MOTOR CYCLES FOR SALE.

Bradbury.

BRADBURY, 4h.p., 1913, 2-speed countershaft gear, coachbuilt sidecar, overhauled, re-enamelled, plated, new cylinder, chains, and all worn parts; £32/10.—Winsor, Springfield Villas, Baker St., Weybridge. [9704

1913 Bradbury, 4h.p., 3-speed Sturmey hub and clutch, B. and B., Bosch, recently overhauled, very fast; bargain, £21; owner ordered to France.—Write, Lt. Gibson, No. 2, School of Instruction, Bedford. [9656

BRADBURY, 4h.p., Brampton gear, lamps, fitted paraffin vaporiser with excellent results, splendid condition, £21; Bradbury, with fixed engine, £16; recently enamelled and plated.—Bunting's Second-hand Department, Masons Av., Harrow. [9862

BRADBURY, 4h.p., 1912, N.S.U. 2-speed, engine rebushed December, Binks carburetter, 2 lamps, separate generators, mechanical horn, Stewart speedometer, nearly new Dunlop rear, covered wicker sidecar, all tools; £27.—63, Briarfield Av., Church End, Finchley. [X7959

Brough.

BROUGH, 1915, 3½h.p., countershaft 2-speed, just completely overhauled by makers, like new, all accessories; 49 gns.; also some petrol.—Particulars, Box 803, c/o *The Motor Cycle*. [X8138

B.S.A.

B.S.A., 1917 models H and K, with sidecars, in stock.—Moss, Wem. [X8166

COLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A.—1917 Model H and K in stock; cash or deferred payments. — Jones, Garage, Broadway, Muswell Hill. [9887

1912 Clutch B.S.A., in good condition, and accessories; seen any time; £24. — Bounds, Garage, 223, High Rd., Kilburn. [9707

B.S.A., 1917 H and K Models in stock for immediate delivery; exchanges entertained.—Eagles and Co., High St., Acton, London. [X8080

B.S.A., 1914, 4¼h.p., 3-speed, chain drive, kick starter, a splendid running machine; £40.—Alexander's, 115, Lothian Rd., Edinburgh. [9371

1916 (late) B.S.A., 4¼h.p., Model K, with light coachbuilt sidecar, very little used, condition as new; £62.—Box L3,376, c/o *The Motor Cycle*. [9866

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529

LATEST B.S.A., 4¼h.p., chain-belt, coachbuilt sidecar to match, Stewart horn, lamps, total mileage 125, as new; £64.—Wilden, Gulgong, Keyford, Frome. [X8158

B.S.A., 1916, 4¼h.p., chain drive, countershaft 3-speed, clutch, kick starter, lamps, horn, etc., in tip-top condition; £53.—90, Bloomfield Rd., Woolwich. [9625

B.S.A. Motor Bicycles, chain and chain-cum-belt models in stock.—A. Watkins, The B.S.A. Agent, 150, Stoney Lane, and 565, Stratford Rd., Sparkhill, Birmingham. [X7440

4¼h.p. B.S.A., 1915 and 1916 models, second-hand, fitted with 3-speed countershaft gear, some with sidecars, from £50; easy terms arranged, or exchange.—Wauchope's, B.S.A. City Agent, 9, Shoe Lane, Fleet St., London. [9761

1917 B.S.A. Model K and Watsonian touring sidecar, with lamps, speedometer, mechanical horn, tools, spares, only been 5 miles, absolutely perfect, for powerful up-to-date twin combination, cash either way.—Particulars to Hodgskin, Letchmore Heath, Watford. [9622

Calthorpe.

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles. [0799

CALTHORPE-J.A.P., October, 1916, 800 miles; £29; perfect; cost £40.—Box 801, c/o *The Motor Cycle*. [X8102

1915¾ 2¾h.p. Calthorpe, J.A.P. 2-speed, speedometer, lamps, new condition; £29.—63, Solon Rd., Brixton. [X8086

1914 Calthorpe Junior, Precision engine, 2-speed gear, going order; first cheque £13 secures.—Box L3,363, c/o *The Motor Cycle*. [9636

2¾h.p. Calthorpe-Japs, 1917 models, 2-speed gear; £39/18; extended payments 2% only, or exchange.—Wauchope's, 9, Shoe Lane, London. [9785

CALTHORPE-J.A.P., 1917, latest model, Enfield 2-speed, just arrived from works: 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9678

CALTHORPE-J.A.P., 1916, Enfield 2-speed gear, speedometer, accessories, perfect condition; £24, bargain.—184, Queen's Rd., Peckham, S.E.15. [X8025

CALTHORPE, 2-stroke, 1917, latest model, Enfield 2-speed; 33 gns.; just arrived from works.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9680

1916 Calthorpe-Jap, 2¾h.p., Enfield 2-speed, very little used; £30, or nearest; seen on appointment.—E. D. Lloyd, 75, Addiscombe Rd., Croydon. [9852

CALTHORPE 2-stroke, new, but slightly shop-soiled, Enfield 2-speed; special bargain, 27 gns., usual price 33 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9681

COMPARE OUR PRICES

with those ruling as averages, and you will see that, whilst on the average they are actually those asked by private owners, you have the grand advantage of knowing that all our machines are

OVERHAULED & GUARANTEED,

whilst the cost is no higher, and, in many cases, even less, than the average ruling prices.

SECOND-HAND BARGAINS.

SIDECAR OUTFITS.

TRIUMPH, 3½ h.p., 2-speed countershaft, Sidecar ... £30
ZENITH, 1914, 8 h.p., countershaft clutch model *£50
RUDGE, 1913, 5-6 h.p. Multi, with Rudge Sidecar £40
ENFIELD, 6 h.p., 2-speed, twin, Enfield Sidecar £29
RUDGE, 1913, 3½ h.p. Multi, coach-built Sidecar *£30
SCOTT, 1914, 3½ h.p., 2-sp., and Scott sidecar £47
ZENITH, 1915, 3½ h.p., twin, clutch, and C.B. Sidecar £45
JAMES, 4½ h.p., 1914, 3-speed, Empress Sidecar *£45
SUNBEAM, 1916, 3½ h.p. Combination *£77
ZENITH, 1914, 8 h.p., clutch, and Sidecar.....*£60
SINGER, 1913, 4½ h.p., 2-speed, and Sidecar £33
CLYNO, 1914, 6 h.p., 3-speed, and Sidecar.....*——

LIGHT CARS, Etc.

G.W.K., 1914, 8 h.p., just re-painted £120
SINGER, 1913 (late), 5 lamps, dickey *£140
HILLMAN, 1915, 9.5 h.p., speedometer, little used.*£215
MATHIS, 1914, 15 h.p., 5-seater, dynamo .....*——
SWIFT, 1915, 10 h.p., dynamo, like new.....*£250
BELSIZE, 1912, 10-12 n.p., dynamo *£135
MORGAN, 1913, 8 h.p., hood and screen.....*£60
CALTHORPE, 1916, 10 h.p., 4-seat, dyna. and start *£250
HUMBERETTE, 8 h.p., 1913, wants overhauling £36

SOLO MOUNTS.

DOUGLAS, 1914, 2¾ h.p., 2-speed, T.T. *£35
DOUGLAS, 1915, 2¾ h.p., 2-speed, model V.....*£45
DOUGLAS, 1914, 2¾ h.p., 2-speed *£40
DOUGLAS, W. O., 1916, 2¾ h.p., 2-speed.....*£50
TRIUMPH, 1912, 3½ h.p., clutch model, Bosch *£25
TRIUMPH, 1914, 4 h.p., 3-speed, Bosch.....*£40
TRIUMPH, 1912, 3½ h.p., Staodard touring *£22
TRIUMPH, 1913, 3½ h.p., 3 speed, all accessories ...*£30
TRIUMPH, 1914, 4 h.p., 3-speed (late date) *£42
TRIUMPH, 1909, 3½ h.p., delivered 12.12.08 ..... £17
INDIAN, 1914, 7-9 h.p., clutch model, speedometer .*£40
ENFIELD, 1911, 2¾ h.p. twin, 2-speed, chain drive..*£20
ENFIELD, 1911, 2¾ h.p. twin, Grado gear *£14
HUMBER, 1914, 3½ h.p. 3-speed, water-cooled *£38
CALTHORPE, 1914 (late), 2¾ h.p., 2-sp., 2-str. *£22
PREMIER, 1913, 2¾ h.p., single-cyl., fine lightweight .. £12
CALTHORPE, 1914, 2 h.p., 2-speed, 4-stroke £15
BAT-JAP, 5-6 h.p., overhead valves, T.T..... £30
IVY, 1915, 2¾ h.p., 2-speed, 2-stroke £25
TRIUMPH, 1914, 4 h.p., 3-speed, T.T. bars, like new £48

Machines starred (*) are complete with lamps, horn, etc.

NEW 1917 MODELS.

ROYAL ENFIELD, 2¾ h.p., 2-speed, 2-stroke £44 2
B.S.A., 4¼ h.p., 3-speed, belt, K, 1917 model £64 0
B.S.A., 3½ h.p., Model D, T.T. £52 10
ROVER, 1917, 3½ h.p., T.T., Philipson pulley ... £61 10
HARLEY-DAVIDSON, 7 h.p., 17F, 3-speed £93 0
HARLEY-DAVIDSON, 7 h.p., 17J, electric equip...£102 0
HARLEY-DAVIDSON Sidecar to either of above.. £24 10

CANOELET, SWAN, & WATSONIAN SIDECARS EX STOCK.

NEW 1916's.

(Note Reduced Prices.)

ROYAL RUBY, 2¾ h.p., 2-speed, 2-stroke £32 5
ROYAL RUBY, 2¾ h.p., J.A.P., single-speed £28 15
COVENTRY EAGLE, 2¾ h.p., single-speed, 2-stroke £30 15
LEVIS 2 h.p. Popular model £29 0

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Calthorpe

CALTHORPE-J.A.P., new, but slightly shop-soiled, Enfield 2-speed; special bargain, 32 gns., usual price 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9679

P. J. EVANS, Birmingham and District Agent.—Calthorpe 1917 models in stock; two-stroke and four-stroke lightweights, and 4-5h.p. twins, solo or as combination.—John Bright St. [X8071

CALTHORPE-JAPS, 2-speed model, in stock; exchanges and deferred payments entertained.—Lamb's, 151, High St., Walthamstow, E.17; also at 50, High Rd., Wood Green, N. [9835

1917 Calthorpe-Jap, 2¾h.p., new January, Dunlops, Enfield 2-speed countershaft, Amac, horn, only done 300 miles, excellent condition; good reason for sale; £35.—148, Earlsdon Av., Coventry. [X8170

Campion.

1916 Campion, 2-stroke, as new, guaranteed perfect; £21.—Jones, Garage, Broadway, Muswell Hill, N.10. [9902

Centaur.

2½h.p. Centaur Coachbuilt Combination, 2-speed, new tyres, tank, lubricator, and belt, overhauled; trial; £22, or exchange.—Daws, 40, West Hill, Wandsworth. [X7989

Chater-Lea.

CHATER-LEA, 8h.p., genuine No. 7 combination, 3-speed gear, good condition; £35.—Verney, Dorking. [9214

CHATER-LEA, 2¾h.p. 1915 Villiers engine, 2-speed countershaft gear, T.T. handle-bars; £26/10.—Eagles and Co., High St., Acton, London. [X8081

Chater-Lea-Jap.

CHATER-LEA-J.A.P., 1915, 4h.p., and 14 gn. Phœnix coachbuilt sidecar, 3-speed, clutch, P and H, new Kempshalls unpunctured, mat, apron, as new; £45, or exchange higher power, adjustment; Enfield preferred.—Angell, 8, Garnham St., Stoke Newington. [9720

CHATER-LEA, 8h.p. J.A.P., 1915, and 2-seater sidecar, used Sundays only, 2 speeds, hand and foot control, hub clutch, handle starter, Bosch mag., B. and B. carburetter, P. and H. and Miller lamps, rims, 650×65, nearly new tyres and tubes, splendid condition; seen, tried any time; £55.—Butcher, 241, Brighton Rd., Croydon. [9648

Chater-Lea-Minerva.

CHATER-LEA Racing Minerva, 5h.p. twin; 15 gns.; appointment.—Miss E. May, 66, Greyhound Lane, S.W.16. [9770

Chater-Precision.

1916 Chater-Precision, 3½h.p., brand new, shop-soiled only, T.T. model; a real bargain, £27.—Jones, Garage, Broadway, Muswell Hill, N.10. [9903

Clyno.

CLYNO 1912 6h.p. Combination; £35/10.—Motor Exchange, Horton St., Halifax. [9446

1912 6h.p. Clyno, 2-speed, chain drive; £22.—Wilkin and Co., Hunter's Bar, Sheffield. [X8128

CLYNO, 1914, 2-stroke, very little used; bargain, £22/10.—Herrick, 38, Chambers Lane, Willesden Green. [X7862

2½h.p. Clyno, 2-speed, hand clutch, speedometer, all accessories; £28.—Clyno, 28, Badminton Rd., Balham. [9851

CLYNO 1917 New Military Model Combination, with spare wheel; price and machine right; offers.—Potter, Leicester Grove, Blackman Lane, Leeds. [X8138

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

CLYNO 2-stroke, 2-speed, clutch, 1915 model, fully equipped, indistinguishable from new; any wants seeing; £28/10, no offers.—Priestley, 133, Southgate Rd., Islington, London, N. [9718

Colonial.

COLONIAL 2-stroke, £23, 2½h.p. Villiers engine.—Carter's Cycle Works, Nuneaton. [X7966

Connaught.

CONNAUGHTS, latest models in stock, single and two-speeds; prices from £28/17/6; shop-soiled model, £27.—P. J. Evans, John Bright St., Birmingham. [X8073

CONNAUGHT 1916, 2¾h.p., 2-stroke, fitted Dunlop tyres and new belt, guaranteed perfect condition, not been used for 6 months; £20.—27, Woodbridge Rd., Moseley, Birmingham. [X8180

BIRMINGHAM Agent, P. J. Evans, John Bright St.—1917 models of the famous Connaught two-stroke, standard 2¾-3h.p. models, either solo or with sidecar; miniature models, single or 2-speed countershaft gear; prices from 27 gns. [X8068

Coventry Eagle.

2½h.p. Coventry Eagle, 2-stroke, 1914-1915, lamps, horn, single-speed, in first-class condition; £19.—Bond, 245-247, Euston Rd., N.W. [9641

MOTOR CYCLES FOR SALE.

De Dion.

3½h.p. De Dion Bouton, H.T. mag., B.B., h.b.c., new Grado pulley and tyres, Dynalite head and rear light, and spare accumulator, only requires new belt; £12/10.—Young, 31, Derby Av., North Finchley. [9705

Douglas.

DOUGLAS, 1913¾, 2¾h.p., T.T., 2-speed; £26.—29, St. Leonard's St., Bow. [9819

1913 Douglas, T.T., 2-speed; first cheque £25 buys, bargain.—Bassetts, Doncaster. [X8024

DOUGLAS, 1914, 2-speed, splendid condition; £38.—Passey, St. Albans Rd., Watford. [9614

1913 Douglas, T.T., 2¾h.p., 2-speed, tyres as new; 28 gns.—Railway Garage, Staines. [9870

1913 Model N. Douglas, first-class order; £30, or near offer.—Gray's Garage, Guildford. [9275

DOUGLAS, 1914, 2-speed, T.T., not ridden 1,000 miles; £35.—H., 19, Grimwood Rd., Twickenham. [9723

1914 2¾h.p. Douglas, 2 speeds, in perfect condition; owner joined up; £30.—35, Mile End Rd., E.1. [9845

DOUGLAS, 1911, perfect throughout, fully equipped; £12/10, snip.—119, Ley St., Ilford. [9846

1914 (late) Douglas, Model U, most carefully kept, exceptional order; 38 gns.—Railway Garage, Staines. [9871

1915 Douglas, 2¾h.p., Colonial model, head lamp and horn; £44.—George, 23, South Parade, Chelsea. [9844

DOUGLAS, 1914, 2¾h.p., T.T. model, with accessories; £42/10.—Motor Exchange, Horton St., Halifax. [9447

1914 2¾h.p. Douglas, T.T. bars, complete lamps, horn, numbers, etc.; £34.—Cross, Jeweller, Rotherham. [X8093

DOUGLAS, 1914½, 2-speed, excellent condition throughout; 32 gns.—245, Hammersmith Rd., London, W. [9793

DOUGLAS, 1914, T.T., Cowey, Lucas, everything unscratched; £38; appointment.—2, Thirlmere Rd., Muswell Hill. [X8043a

DOUGLAS, 1914¾, 2-speed, accessories, spares, exceptional condition; £37.—Hughes, Thornton House, Aadover. [9640

1911 2-speed Douglas, in perfect order, guaranteed, overhauled; £21.—Jones, Garage, Broadway, Muswell Hill, N.10. [9904

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Teovil. Tel.: 50. [5855

1914 Douglas, 2¾h.p., T.T., 2-speed gears, free engine, perfect condition; £35.—2, Abbey Court, Abbey Rd., N.W. [9722

DOUGLAS, 2¾h.p., W.D., all black, lamps, horn, and spares, mileage 1,000.—7, Cambridge Crescent, Edgbaston, Birmingham. [X8014

HOLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

DOUGLAS, 1915, Colonial model, complete lamps, speedometer, tools, in fine condition; £38.—1, Quex Rd., Westgate-on-Sea. [9695

DOUGLAS, 1915, perfect condition, little used, lamp set, bag, horn; £40.—Waterson, 162, Acre Lane, Brixton. 'Phone: 1037. [9650

DOUGLAS, late 1913, 2¾h.p., 2-speed, lamps, horn, tyres new, very economical; £30.—Mackenzie, J. Block, Section 4, Invergordon. [X7965

1915 2¾h.p. 2-speed T.T. Douglas, and accessories, in good condition; £42/10; seen any time.—Sounds, Garage, 223, High Rd., Kilburn. [9709

1914 Douglas, 2¾h.p., 2-speed, perfect condition, with speedometer and accessories; £36.—L. Tomato and Co., 25, Brookmill Rd., Deptford. [9737

DOUGLAS, 4h.p., 2-speed, clutch, kick starter, faultless condition, accessories; £48; exchange entertained.—Malbrooke, Welsey Rd., East Molesey. [9716

1914 Douglas, re-bored, 62mm., aluminium pistons fitted, racing cam, new Goodrich tyres, very fast; £40.—William Nixon, Brampton, Cumberland. [X8075

DOUGLAS, 2¾h.p. T.T. Model, 1913-4, re-enamelled and plated, overhauled, new tyres; £32/10; accessories.—Eagles and Co., High St., Acton, London. [X8081a

WAR Office Douglas, 2¾h.p., 2-speed, road soiled only, really brand new, mechanically perfect, guaranteed; £53.—Robinson's Garage, Green St., Cambridge. [9754

1914 2¾h.p. T.T. Clutch Model Douglas, free engine, fully equipped, good condition; £36; exchanges.—Martin Wright, Victoria Embankment, Nottingham. [X8101

DOUGLAS, 1916, 2 speeds, T.T., Lucas lamps, Klaxon, Watsonian light sidecar, lovely turnout; 48, cost £73.—51, Maplethorpe Rd., Thornton Heath, Croydon. [9713

1915 2¾h.p. 3-speed Douglas, kick starter, clutch, footboards, speedometer, lamps, horn, mirror, spares, splendid condition; £46.—99, Meadow St., Moss Side, Manchester. [X8057

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7-9 h.p. **HARLEY - DAVIDSON** Standard Combination £117 10
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2½ h.p. **NEW HUDSON**, Model C, 2-speed £38 0
7-9 h.p. **HARLEY-DAVIDSON**, 1916, and Sidecar £102 9
2½ h.p. **ROYAL RUBY**, single-speed £47 5
2½ h.p. **ROYAL RUBY**, 2-speed £40 0
2½ h.p. **ROYAL RUBY**, 2-speed, J.A.P. . £46 0
6 h.p. **ENFIELD** Tradesman's Outfit, slightly soiled £90 0

SECOND-HANDS.

ENFIELD 1916 Commercial Box Carrier £12 12
8 h.p. **ENFIELD** Comb., 1917, slightly shop-soiled £90 0
6 h.p. **ENFIELD** Comb. (Jan., 1917), 3 lamps, horns £89 10
3 h.p. **ENFIELD**, 3-sp. £35 0
7-9 h.p. **HARLEY-DAVIDSON**, 1915, elec. model, coach Sidecar £72 10
2½ h.p. **T.D.C.**, 1916, 2-sp., original tyres still on, spare tank £25 0
2½ h.p. **ALLDAYS ALLON**, 2-sp., clutch, all accessories £36 10
2½ h.p. **COVENTRY-EAGLE**, 2-sp., 2-str., special price £39 10
2½ h.p. **JUNO-VILLIERS**, 1916, all access., mileage about 100 ..... £33 10
4½ h.p. **JAMES**, 1915, 3-sp., kick-start, lamps, horn £57 10
2½ h.p. **ALLDAYS ALLON**, 1915, single-speed, and access. £27 10
1 h.p. **AUTO-WHEEL**, B.S.A. model ... £12 12
2½ h.p. **LLOYD-VILLIERS**, 1916, single-speed, lamp, horn £31 0
2½ h.p. **O.K. JUNIOR**, 1916, 2-sp., only shop-soiled, 2 lamps, horn £28 10
3½ h.p. **ROVER**, 1913, Philipson pulley, 2 lamps, horn, very fast £35 10
2¾ h.p. **DOUGLAS**, 1913, 2-speed, and acc. £32 10
6 h.p. **ENFIELD**, 1916, Comb., Lucas accessories, beautiful order £85 0
3½ h.p. **BRADBURY**, 1912, 2-speed £22 10
2 **ENFIELD** Box Carriers, each £15 15
B.S.A. No. 1 Sidecar £17 17

All **Watsonian Sidecars** in stock from **£9 2s. 6d.** to **£14 14s.**

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MOTOR CYCLES FOR SALE.

Douglas.

1915 2¾h.p. Douglas, 2-speed, semi T.T. bars, 2 Lucas lamp sets, Watford speedometer, horn, etc., in perfect mechanical order; £50.—Robinson's Garage, Green St., Cambridge. [9755

RIDER TROWARD, 78, High St., Hampstead.—1913 T.T. Douglas, 2-speed, 32 gns.; another ditto, new 1914, perfect, 34 gns.; 1914 lady's Douglas, 2-speed, clutch, k.s., 34 gns. [9825

1915 Douglas, 2¾h.p., delivered from works February, 1916, lamps, horn, and accessories, not run 150 miles, guaranteed condition as new; £48.—Write, Gilbey, Summers Hotel, Preston, Lancs. [9611

DOUGLAS, 1913, 2¾h.p., 2-speed, tyres nearly new, P. and H. head lamp and generator, rear lamp, horn, spare belt and tube case; £29/15.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9684

DOUGLAS, 1914½, T.T. Model, semi T.T. bars, 2-speed, in perfect condition, little used, Lucas horn, lamps, many spares, tubes, belt, etc., long exhaust; bargain, lowest £37.—Truscott, Jeweller, Sidmouth. [X7863

DOUGLAS, 1912, 2¾h.p., 2-speed, £27; this machine has one of the best engines we have ever seen—in fact, we do not think you can obtain a 1912 Douglas in equal condition at any price.—Layton's Garage, Bicester, Oxon. [9879

2¾h.p. 1915 Douglas, 3-speed gear model, kick starter and free engine model, fitted with all accessories, including speedometer, warning signal, in condition good as new; £45; guaranteed.—Wauchope's, 9, Shoe Lane, Fleet St., London. [9773

LATE 1915 Douglas 2-speed T.T. Colonial Model, all black, large, long extended exhaust pipe, Lucas horn, P. and H. head (large), rear lamp, etc., foot board or foot-rest optional, in real good order, guaranteed perfect; £45.—Jones, Garage, Broadway, Muswell Hill. [9888

DOUGLAS, 2¾h.p., latest pattern, absolutely new, including clutch Model W, touring Model U and V; immediate delivery against Minister Munitions permits; special facilities doctors, farmers, national workers.—Full particulars, Robinson's Garage, Green St., Cambridge. [9758

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012

EDMUND, spring frame, 2¾h.p. Levis engine, Enfield gear; £52/10.—Wilkin and Co., Hunter's Bar, Sheffield. [X8130

Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2¼h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

1916 Enfield, 3h.p., mileage 700; £45. Broadhead, Warth Mills, Diggle, Oldham. [X8047

ENFIELD 1916¾ 6h.p. Combination, mileage 500; £78.—29, St. Leonard's St., Bow. [9820

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Enfields, 8h.p., 6h.p., and 2-stroke in stock. [9578

ENFIELD 1915 6h.p. Combination, only done 600 miles; £68.—Passey, St. Albans Rd., Watford. [9615

ROYAL Enfield, 2¼h.p. twin, 2-speed; £21, or on gradual payments.—248, Bishopsgate, London, E.C. [9729

6h.p. Royal Enfield Combination, complete overhaul; £45; guaranteed.—Wauchope's, 9, Shoe Lane, London. [9787

ENFIELD 2¾h.p. Twin, 2-speed, free engine, in splendid condition; £34.—Wyatt, Menadew, Bugle, Cornwall. [9673

ENFIELD 1916 6h.p. Combination; a bargain, £68/10.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9674

ENFIELD, 1917, 3h.p.; 55 gns.; just arrived from works.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9676

2¼h.p. New Royal Enfields, 2-stroke, 1917; £44/2; extended payments, or exchange.—Wauchope's, 9, Shoe Lane, London. [9783

1917 6h.p. Enfield Combination, also 3h.p. 2-speed models from stock.—Jones, Garage, Broadway, Muswell Hill, N.10. [9905

ENFIELD 1917 6h.p. Combination; 90 gns.; just arrived from works.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9675

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock for immediate delivery.—See below.

1917 6h.p. Enfield Coachbuilt Combination, with apron and mat, 2 speeds, clutch and starter, 90 gns.; extra for hood and screen, £4/19.—Below.

1917 3h.p. Enfield, solo or sidecar mount, 2 speeds, clutch, and kick starter; 55 gns.; sidecars from 7 gns.—Below.

1917 Enfield Two-stroke, 2¼h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright St., Birmingham. [X8066

MOTOR CYCLES FOR SALE.

Enfield.

ENFIELD 6h.p. Combination, coach, powerful, fast, splendid condition; must sell; 40 gns., bargain.—804, Seven Sisters Rd., Tottenham. [9572

ENFIELD, late 1915, 8h.p. combination, fitted Lucas dynamo lighting set, horn, speedometer; £70.—Withers, 64, High St., Stourbridge. [X8111

1913-14 Enfield Combination, coach sidecar, £49/10; 1912 Enfield combination, cane sidecar, £39/10.—Collier's Motories, Deal St., Halifax. [9448

ENFIELD, 2-stroke, 1917 model, 2-speed, only used 30 miles, perfect, and would pass for new; £39/10.—Alexander's, 115, Lothian Rd., Edinburgh. [9370

ENFIELD 1916 (late) Combination, all lamps, etc., could not tell from new; an absolute bargain, £82.—Jones, Garage, Broadway, Muswell Hill. [9889

ENFIELD 3h.p. Twin, 1914, 2-speed, kick starter, speedometer, lamps, new tyres, all spares, splendid condition; £35.—101, Tooting Bec Rd., S.W. [9634

ENFIELD Combination, 6h.p., 1916, only run a few hundred miles and equal to new, completely equipped; 70 gns.—Longman Bros., King St., Acton, W.3. [9764

1916 3h.p. Twin Enfield Lightweight, 2-speed, kick starter, Palmer cord tyres, had little use, and equal to new; £40.—The Premier Motor Co., Aston Rd., Birmingham. [9816

3h.p. 1917 Royal Enfield, 2-speed gear model, fitted with Canoelet sporting sidecar, almost new; the combination £57/10; guaranteed.—Wauchope's, 9, Shoe Lane, London. [9778

1916 Royal Enfield Combination, Lucas dynamo lighting, hood, screen complete, nice machine; any severe trial given; £87/10; guaranteed.—Wauchope's, 9, Shoe Lane, London. [9772

ENFIELD, 1917, 2-stroke, £44/2; just arrived from works; we are Enfield specialists; immediate delivery; all models in stock.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9677

ENFIELD 1917 6h.p. Combinations and 2-stroke models in stock; in addition to the above, we can offer immediate delivery of most first-class makes. Send us your enquiries.—Parker's, Bradshawgate, Bolton. 'Phone: 1348. [X8174

ENFIELD 6h.p. Coachbuilt Combination, new November, 1916, only done 200, hood, wind screen, Pall saddle, red leather Pillion seat, leather undershields, all-black horn, and 3 lamps, hardly soiled; £87/10.—Gayford, 205, Anerley Rd., Anerley. [9702

ENFIELD 8h.p. Combinations (2-seater £3 extra), £96/12; 6h.p., £94/10; 2¼h.p., 2-speed, 2-stroke, £44/2; 3h.p., 2-speed, £57/15; also slightly shop-soiled 1917 8h.p. combination, £90; 1916 (late) 6h.p., with Lucas accessories, speedometer, £85; also a Jan., 1917, 6h.p. combination, with accessories, £89/10; extended payments by arrangement.—Lamb's, 151, High St., Walthamstow, E.17; and 50, High Rd., Wood Green, N. [9839

Excelsior.

WE Can Give Immediate Delivery from stock of the new Model 7h.p. 3-speed American Excelsior with mechanical lubrication, hand and foot control to clutch, etc., complete with Montgomery coachbuilt sidecar, enamelled to match; £90; liberal exchanges.—To be obtained only from the Premier Motor Co., Aston Rd., Birmingham. [9815

F.N.

F.N., 1914, 2¾h.p., 2-speed, equal to new; £20.—Passey, St. Albans Rd., Watford. [9616

Harley-Davidson.

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Harley-Davidsons, delivery from stock. [9577

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802

LATE 1915 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0861

HARLEY-DAVIDSON 1915½ Combination, coachbuilt sidecar, electrically equipped, just overhauled, excellent condition; £68, or near offer.—Box L3,365, c/o *The Motor Cycle*. [9658

1915 Model 11F 7-9h.p. 3-speed Harley-Davidson, lamp, horn, and tail lamp, 28×3in. tyres, Canoelet sidecar, enamelled to match, in perfect condition; £65.—The Premier Motor Co., Aston Rd., Birmingham. [9817

HARLEY-DAVIDSON, 7-9h.p., 3 speeds, 11J, 1915 combination, Harley sidecar, re-enamelled, unused since, condition as new, good tyres, accessories; owner joining up; on view any time.—102, Grove Vale, East Dulwich. [9733

LATE 1915 Harley-Davidson Combination, 11J, electric model, fully equipped, speedometer, etc., Swan 20 gn. sidecar; price £70, or near offer.—Nicholls, 39, Westbourne Terrace, North Paddington, W. 'Phone: Padd 3418. [X8163

HARLEY-DAVIDSONS.—Immediate delivery; new magneto models, £84/15; several second-hand 1915 and 1916 combinations from £65; exchanges arranged.—Colmore Depots, 31, Renshaw St., Liverpool, and 211, Deansgate, Manchester. [0885

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2½ h.p. 1914 **O.K.-PRECISION.** Useful motor cycle	£16 0
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5-6h.p. 1914 **CLYNO** and Sidecar	£55 0
5-6h.p. 1914 **CLYNO** and Sidecar, overhauled	£65 0
4½ h.p. 1916 **B.S.A.,** all-chain drive, lamps, speedometer, all accessories	£55 0
3½ h.p. 1915 **ROVER,** 3-sp. countershaft, lamp, speedometer, tools, overhauled, like new	£50 0
6 h.p. 1915 **A.J.S.** de Luxe Outfit, overhauled, sidecar repainted. Guaranteed	£80 0
1916 **HOBART** and Sidecar, fitted with hood and screen, all accessories	£47 15
4 h.p. 1916 **JAMES,** complete with all accessories, good condition	£48 0

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SECOND-HAND LIGHT CARS from £62 10s.

MOTOR CYCLES FOR SALE.

Harley-Davidson.

BRAND New Model 11F 7-9h.p. 3-speed Harley-Davidson, complete with special Montgomery coachbuilt sidecar, enamelled to match, 28×3in. tyres, spring chassis, luggage carrier, etc.; £90.—The Premier Motor Co., Aston Rd., Birmingham. [9818

HARLEY-DAVIDSON.—New 1917 models in stock, 7-9h.p., 3-speed model 17F, £93; also one new 1916 Model 16F, £84/15; sidecars to match; cash, exchange, or extended terms quoted.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0551

7-9h.p. Harley-Davidson, late 1915, with 1916 improvements, and Gloria sidecar, electric light and horn, also pneumatic horn, speedometer, very little used, tyres in splendid condition; owner fighting; £70, a bargain.—C. Wigg, 31, Bow St., W.C.2. Tel.: 1040 Gerrard. [9735

HARLEY-DAVIDSONS actually in stock, £117/10; electric combination, £126/10; exchanges, extended payments; also 1915 electric outfit, 7-9h.p., with new G.K. sidecar, 70 gns.—Lamb's, 151, High St., Walthamstow, E.17; and 50, High Rd., Wood Green. [9838

HARLEY-DAVIDSON 1915 7-9h.p. Model 11J, with special Canoelet coachbuilt sidecar with luggage grid, electric lamp, etc. (combination delivered 1st January, 1916); seen Bournemouth or Salisbury by appointment; 70 gns.—Paymaster Ray, East Monkton House, Blandford. [9626

Hazlewood.

HAZLEWOOD, 2½h.p. J.A.P., 3-speed, Bosch, new tyre on back, perfect running order; £16.—Box L3,377, c/o *The Motor Cycle*. [9867

RIDER TROWARD, 78, High St., Hampstead.—1914 Hazlewood-Jap, 5-6h.p., 3-speed, clutch, kick start, countershaft drive, Bramble 16 gn. coach sidecar; 47 gns. [9823

5-6h.p. Hazlewood Combination, 1916, 3-speed gear box, kick starter, pinion seat, lamps, horn, coachbuilt sidecar, done 500 miles; £70.—Venner, 44, Moreton St., Pimlico, S.W. [9631

Henderson.

1916 Henderson, 4-cyl., combination, large Phœnix sidecar, extra seat, speedometer, mechanical horn, screen, muffs, various spares; £100.—Smith, Keverne, Tate Rd., Sutton, Surrey. [9669

HENDERSON, 1914, 8-10h.p., 4-cyl., just been overhauled, first-class condition, open to any expert for examination; can be seen Morris's Garage, Oxford; £42 cash; property of officer.—Write, U. Thorburn (Lieut.), 3, St. John's Rd., Abingdon, Berks. [9660

Humber.

1911 3½h.p. Humber; £15/10.—Motor Exchange, Horton St., Halifax. [9456

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham [0882

HUMBER, 1917, latest models, 3½h.p. and 6h.p. horizontal twins, actually in stock.—Moss, Wem. [X8168

1914 3½h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863

1917 3½h.p. and 6h.p. Horizontally-opposed Twin Humbers in stock.—Wilkin and Co., Hunter's Bar, Sheffield. [X8122

3½h.p. Humber, 2-speed, handle start, speedometer, lamps, etc., in good condition.—Apply, Meeks, 55, Dalling Rd., Hammersmith, W.6. [9645

1917 Humber Flat Twin, 3-speed, and sidecar, not done 100 miles; £75.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [9470

HUMBER, 3½h.p., with Roc 2-speed, handle starting, thoroughly overhauled; £23, or on gradual payments.—248, Bishopsgate, London, E.C. [9728

HUMBER, 1913, 3½h.p., just overhauled, new tyres and gears, 2-speed, handle starting, coachbuilt sidecar; £27.—Smith, 37, Hanover Sq., Bradford. [X8091

HUMBER, 3½h.p., 2-speed, B. and B. carburetter, Bosch mag., just overhauled, in good condition; £10/10.—Reeder's Garage, Scampston Mews, N. Kensington. [9621

HUMBER, 1913, 3½h.p., coach combination, 3-speed Sturmey-Archer, everything new condition; good reason for selling; £30.—Hill, Lord St., Brierfield, near Burnley. [X7964

LATE 1912, 3½h.p. Humber, 2-speed, free, new Dunlop tyre and belt, new valves, speedometer, thoroughly overhauled; £18; exchange higher power.—27 Brantwood Terrace, Norman Rd., Moston, Manchester [X8149

HUMBER 2h.p. Lightweight, 1912-1913, 120 m.p.g. quiet, and pulls well, in new condition and appearance, only wants seeing; £12/10; can ride away any distance; call evenings, or week-ends.—64, Mill Lane, Brixton Hill. [X8045

HUMBER 1914-1915 Coachbuilt Combination, 3-speed, kick starter, Mills-Fulford spring wheel sidecar, fitted with screen, speedometer, new tyres and belt, 1916 Pilot jet B. and B., Lucas lamp and horn, tip-top combination, and condition like new; any trial; fully guaranteed; £42; seen evenings or week-ends.—64, Mill Lane, Brixton Hill. [X8045

MOTOR CYCLES FOR SALE.

Indian.

1915 5h.p. T.T. 3-speed Indian, excellent condition; £40.—Write, Bramwell, 44, Marine Parade, Brighton. [9654

INDIAN, 7-9h.p., clutch, kick starter, condition as new, £35; sidecar to match, £7.—King, 73, Hill St., Peckham. [9734

TWIN Red Indian and sidecar, coach; £40; perfect condition.—Owen, 162, Acre Lane, Brixton. Phone 1037. [9649

INDIAN, late 1915, Canoelet sidecar, elaborately equipped, little used; sacrifice £55.—Lieutenant Keddie, Westcliff. [9688

1916 5h.p. Indian and Coachbuilt Sidecar, indistinguishable from new; £67.—Wilkin and Co., Hunter's Bar, Sheffield. [X8125

INDIAN, 7-9h.p., clutch model, splendid condition; £30, or exchange lower power machine.—S.G., 5, Rayleigh Rd., Basingstoke. [9814

INDIAN, 1916, 5h.p., 3-speed, T.T. bars, clutch, kick starter, very little used, and good as new; £58.—Alexander's, 115, Lothian Rd., Edinburgh. [9369

INDIAN, 7-9h.p., Powerplus, Sept., 1916, with Indian sidecar, new 3 weeks ago; what offers?—Lamb's, 151, High St., Walthamstow, E.17. [9834

1915 5h.p. 3-speed T.T. Indian Combination and accessories, in very good condition; £55; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [9708

INDIAN, 1916, 5h.p., coachbuilt sidecar, 3 speeds, clutch, and kick starter, Lucas accessories; £65; solo model, hardly soiled, 60 gns.—P. J. Evans, John Bright St., Birmingham. [X8069

RIDER TROWARD'S, 78, High St., Hampstead.—1911 Indian, 5h.p., perfect, 22 gns.; 1913 spring frame, 7-9h.p., 2-speed, 33 gns.; 1914 road racer, 7-9h.p., clutch, 35 gns. [9826

7-9h.p. Indian, 2-speed clutch model, large C.B. sidecar, electrically equipped, hardly used since 1915; owner on active service, £46; perfect condition.—Choppen, Builder, 79, Aldred Rd., Walworth. [9624

1914 7h.p. Indian, 2-speed, kick start, metal torpedo sidecar, just enamelled and plated, in splendid condition; £45; exchange countershaft Zenith or Rex.—Pittuck, Railway Station House, East Ham. [9652

INDIAN 7-9h.p. Red Combination, Millford sidecar, hood and screen, 2-speed, kick starter, every accessory, combination as new; £46, no offers. Call evenings, or week-ends.—64, Mill Lane, Brixton Hill. [X8046

BARGAIN.—1915 7-9h.p. Indian combination, in new condition, 3 speeds, spring frame, electrically equipped, speedometer, etc., brand new tyres; what offers? seen by appointment.—Oram, Colin Park, The Hyde, Hendon. [9761

INDIAN 1916 Powerplus, 7h.p., 3-speed, clutch, kick starter, Model O, with Indian coachbuilt sidecar, lamp and generator, only used 200 miles, and in absolutely new condition; £90. Wire to secure.—Alexander's, 115, Lothian Rd., Edinburgh. [9372

INDIAN, 1916, 7-9h.p., 3-speed, with Montgomery double spring coachbuilt sidecar, in first-class condition, complete with 3 lamps, generators, speedometer, many spares and tools, very fast, sporting outfit; any trial: £50.—Indian, 53, Broadmead Rd., Folkestone, Kent. [X8007

Invicta.

REAL Bargain.—2½h.p. Invicta, Villiers 2-stroke motor cycle, done 200 miles, like new; sell £25 cash.—4, Wilson St., Hanley, Stoke-on-Trent. [9689

James.

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles. [0803

JAMES 2-strokes, 1917 models, for immediate delivery.—Colmore Depot, 211, Deansgate, Manchester. [0888

JAMES, 1913, 86×96, countershaft gear, and coach sidecar; £39/10.—Motor Exchange, Horton St., Halifax. [9449

1915 James 3½h.p. Twin, 3-speed countershaft gear, handle clutch and kick starter, new chains; £36.—L. Amato and Co., 25, Brookmill Rd., Deptford. [9736

GUARANTEED to run on paraffin neat without any alteration, 1913 James, 4¼h.p., 3-speed countershaft, coach sidecar; 35 gns.—Troward's, 78, High St., Hampstead. [9822

JAMES, 1917 models, for immediate delivery from stock. Big "Four" combiantions, with and without Lucas dynamo lighting set; 3½h.p. twin, and two-stroke models.—P. J. Evans, John Bright St., Birmingham. [X8067

JAMES 1916 4¼h.p. Coachbuilt Combination, not done 1,500 miles, special silencer fitted, complete electric equipmeat, Stewart speedometer, Binks carburetter; £75.—Sheldrake, 497, Grove Green Rd., Leytonstone, E.11. [9629

JAMES 4¼h.p. Combination, 1916, fitted with 3 Lucas lamps and Stewart warner, spare tyre and tube, all accessories, and motoring suit; the lot £70, a bargain; owner called up.—Apply, Calder, 5, Piershill Terrace, Edinburgh. [X8171

J.E.S.

J.E.S. Motor Cycle, B. and B. mag., good tyres; bargain, £7/10.—A. Jenkins, 19, Aspenlea Rd., Fulham. [9808

BELDAM

Not merely a Fancy Pattern.

THE Beldam Tyre is not merely a fancy pattern—it is designed on scientific principles. As a result it does not cut easily. It has most rubber where liability to puncture is greatest. It is narrow and crisp and has a side grip which makes "cornering" safe and comfortable. Apart from these advantages Beldam Motor Cycle Tyres last long.

The Beldam Tyre Co., Limited, Brentford, Middlesex.

New Zealand: J. E. Fitzgerald, 139, Lambton Quay, Wellington, Cape Colony: The Tyre and Motor Co., Rodney St., Port Elizabeth. India: Wilkinson & Co., 7, Old Court House St., Calcutta. Ireland: P. Drohan & Sons, Carrick-on-Suir.

Retreads

The Plant, Materials, and Men behind BELDAM RETREADS are the same as employed in making the famous Beldam Tyres—Quality is the note all through. Have your old Tyres retreaded in the Beldam way before they get beyond repair. Estimate of cost by return post.—The Beldam Tyre Co. Limited, Brentford, Middlesex.

Godbolds

MOTOR CYCLES FOR SALE.

Juno.

JUNO-PRECISION, 4h.p., 2-speed, in very good order; £35, or on gradual payments.—248, Bishopsgate, London, E.C. [9726

JUNO-VILLIERS, 2½h.p., 2-stroke, nearly new condition; £25, or on gradual payments.—248, Bishopsgate, London, E.C. [9727

JUNO-VILLIERS, 2½h.p., 2-stroke, 2-speed, late 1916 model; price £30, or on gradual payments.—248, Bishopsgate, London, E.C. [9725

JUNO-J.A.P., 6h.p., Sturmey-Archer countershaft gear, in good running order; price £45, or on gradual payments.—248, Bishopsgate, London, E.C. [9724

Levis.

LEVIS, latest, brand new, siugle and 2-speed models in stock.—Moss, Wem. [X8165

LEVIS, 1914, 2½h.p., 2-stroke, lamps, etc., etc.; £19.—49, Tottenhall Rd., Palmer's Green. [X8153

1917 Popular and Model E Levises, delivery from stock.—Wilkin and Co., Hunter's Bar, Sheffield. [X8123

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804

LEVIS, 1916½, 2¼h.p. Popular, perfect condition, accessories; sacrifice £22/10.—Motorist, Windsor House, East Molesey. [X8182

LEVIS, 2¼h.p., in splendid condition, speedometer, lamps, horn, etc.; price 19 gns.—Upson Bros., Ascot, Berks. Tel.: 163. [9798

LEVIS 1917 Popular, latest model, just arrived from works; £32.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9682

LEVIS, both models in stock; exchanges, deferred payments.—Lamb's, 151, High St., Walthamstow, E.17; and 50, High Rd., Wood Green, N. [9836

LEVIS Popular Model, special bargain, £27/10, new, but slightly shop-soiled; usual price, £32.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [9683

LEVIS, 1916 Popular Model, brand new; catalogue price £32/10; to clear stock, will accept £26; approval anywhere.—Layton's Garage, Bicester, Oxon. [9880

LEVIS, T.T., 2-speed, mechanical horn, speedometer, knee-grips, lamp sets, new tyres, perfect order; £29, or exchange.—Lieut. Ibbetson, 16, Southbrook Rd., Lee, S.E. [9732

Lincoln-Elk.

LINCOLN-ELK, 4¼h.p., 1914 combination, countershaft 2-speed, clutch, kick starter, Palmer cords, all fine condition; £26.—67, Wantage Rd., Reading. [X8120

Matchless.

MATCHLESS Motor Cycles; no quicker delivery obtainable than from Colmore Depots. [0881

1914 Matchless Combination, 6h.p., 3-speed, clutch, perfect condition, just overhauled; £50, or near offer.—Atkinson, Green Farm, Newport Pagnell, Bucks. [X8054

8h.p. Matchless-Jap Combination, speedometer, lamps, tyres, plating, enamel good; £38; exchange Henderson or single combination.—Nicholson, Butcher, Barking. [9721

7-9h.p. Matchless Combination, 3B Model, M.A.G. engine, 3 speeds, countershaft gear, clutch, kick starter, fully equipped, speedometer, watch, Lucas lamps, horn, and mirror, coachbuilt Matchless 2-seater sidecar, hood and wind screen, all in perfect condition, very little used, mileage 1,500; price £90.—Stafford, 8, Ashton Lane, Sale. [X8175

Minerva.

MINERVA, 2½h.p., mag. ignition; £7, or on gradual payments.—248, Bishopsgate, London, E.C. [9730

MINERVA, 2¾h.p., m.o.i.v., mag., B. and B., runs well on paraffin; £8.—251, Bentley Rd., Doncester. [X8039

Moto-Reve.

£6/10.—Moto-Reve, mag., B.B., spring forks, nearly new tyres and belt; seen running; taken for debt.—Standen, 140, Revelstoke Rd., Southfields, London, S.W.18. [X8142

Motosacoche.

RIDER TROWARD, 78, High St., Hampstead.—1914 Motosacoche, 3½h.p. twin, De Lissa valves, Enfield gear, kick start, new coach sidecar; 44 gns. [9824

2½h.p. Motosacoche, Bosch mag., new piston and belt, not done 100 miles since, in perfect running order; bargain, £14.—Williams, 10, College St., Lampeter. [X8004

New Hudson.

NEW Hudson, 1915, 2¼h.p., 2-stroke, in good condition; £18.—8, Church St., Warrington. [X8019

1913 3½h.p. New Hudson, 3-speed, and coachbuilt sidecar; £32.—Wilkin and Co., Hunter's Bar, Sheffield. [X8127

NEW Hudson, 1915, 2-stroke, 2 speeds, Lucas lamp and horn, in fine condition; £21/10.—4, Devonshire Rd., West Bridgford, Nottingham. [X8077

NEW Hudson, 1916 Model D, 2-stroke, 2 speeds and free, excellent condition, new tyres, just overhauled; £25 cash, quick sale.—Lucas, Bakery, Tingewick. [9623

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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Manufacturers and Enemy Magnetos.

SOME months ago we remarked, with surprise, that British motor cycle manufacturers, either collectively or through their mouthpiece the Manufacturers' Union, had not made any statement on the subject of enemy fittings on motor cycles. We have in mind, of course, principally the question of magnetos, at least ninety per cent. of the trade in which was held by Germany at the outbreak of war.

We need not cover old ground by reiterating more than the fact that British electrical engineers have determined that no such state of affairs shall again exist, nor shall the British motor trade be dependent upon outside sources of supply. But there has been a good deal of work and worry to attain a position which has enabled magneto manufacturers to arrive at such a definite conclusion, and our previous reference to the subject was to deplore the fact that manufacturers as a body, through their union, had not held out more encouragement to British magneto manufacturers by announcing openly and definitely that they would not henceforward fit enemy-made magnetos to their motor cycles.

It is not yet too late to make such a collective decision, and it goes almost without saying that it would considerably strengthen the confidence of British magneto manufacturers. We have no doubt in our minds that every manufacturer is resolved upon a plan of action in this respect, but there is no need to hide such an important decision. Owners of motor cycles would welcome an outspoken statement; it has often been stated by patriotic motor cyclists both verbally and in cold print that they will never accept delivery of another machine fitted with a magneto of German origin. Many unions formed with the object of protecting different trades have been very prominent in this war in taking the lead in matters directly affecting their interests, and we wish we could include the Motor Cycle Manufacturers' Union. It would please thousands to see the Union take this and cognate matters in hand, and show those directly concerned that it, too, is working for the common good.

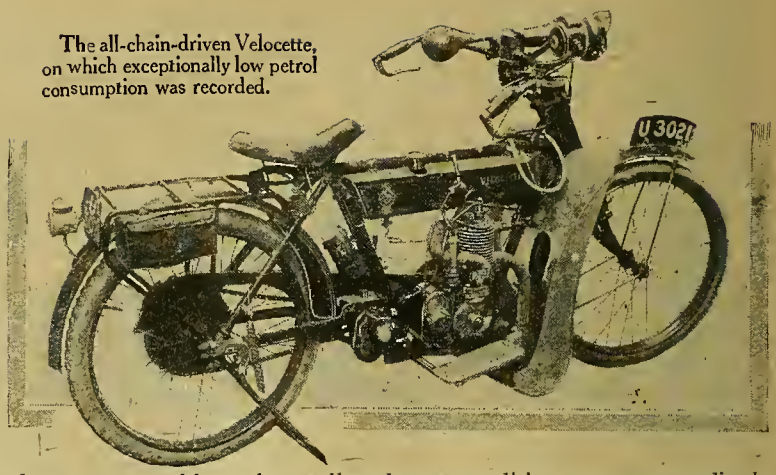
Some Petrol After All!

A NUMBER of readers have advised us that they have received unexpected communications from the Petrol Control Committee on the subject of their petrol licences. It appears that in certain instances the Petrol Control Committee have advised licence holders that if they care to take advantage of the offer they may have so many gallons of petrol per month—usually two gallons in the case of motor cyclists—and should, in case of acceptance, forward a sum equal to the amount of the tax for six months. To say that the recipients are surprised at being *offered* spirit is understating the case, but there is general satisfaction that the Petrol Control Committee are not interpreting their own announcements in the harshest manner, as many feared they would, and, furthermore, that the petrol stocks are such that some petrol at any rate can be spared. It will have been noted that during January and February no fewer than 25,259,724 gallons of spirit were imported. On the other hand, agents and dealers generally have not yet taken kindly to the embargo on substitutes, and instance particularly the altogether unnecessary inclusion of *home-produced fuels*, which do not necessitate tonnage, the scarcity of which was the reason advanced for the prohibition. But we fear that the petrol now proffered to users who supported their original claims with good reasons is bound to lead to anomalies, as a personal experience will prove. Two members of the editorial and photographic staffs of this journal have received spontaneous offers of petrol from the Committee, whilst another staff member has been notified that no more is available for him.

An index to the advertisements in this issue will be found on the page facing the back cover.

AN ECONOMICAL TWO-STROKE.

Some Notes on the Practical Use of the Velocette Two-stroke.



The all-chain-driven Velocette, on which exceptionally low petrol consumption was recorded.

IN the first few weeks that I rode the 2¼ h.p. Velocette two-stroke, which was early in the winter, the nature of my riding was such as to make it somewhat difficult to undertake anything in the way of a fuel consumption test, though it was fairly evident from the first that the small machine was doing something rather remarkable. Much of my riding was then done at night time and over rough mountain roads, and, having no check on the distance covered, I did not trouble to work out consumption, particularly as the amount of low gear work was excessive.

Recently, however, my work has been of a different nature, and the machine has been used solely for running to and from business—a matter of 1.8 mile—four times daily. During the last few weeks the road and weather conditions have been really bad—roads either rough with snow and ice or awash with liquid mud, while the weather conditions have been equally unfavourable as regards good consumption. The long cold snap necessitated much copious flooding ere a start could be made on each of the four journeys per day, and there is no doubt that I lost a good deal of petrol in this way. At the same time, my petrol and oil consumption has worked out at an extraordinarily low figure, and the chief object of this article is to ascertain whether the results are phenomenal, or whether other riders of Velocettes, which are notorious for excellent design and economy, are achieving similar results.

The Economy Hunt.

My petrol consumption, with riding made up under the adverse conditions described—constant flooding, heavy roads, engine never properly warmed—has, during the past seven weeks, worked out at exactly 154 m.p.g.! Oil consumption I have not accurately measured, beyond knowing that the engine runs best with automatic feed adjusted so that exactly a small-sized teacupful of oil is used every seventy miles. By approximate calculation this works out at rather over 3,000 m.p.g., which is about as things should be when no oil is being wasted. As an interesting comparison it may be added that a well-run-in 7 h.p. twin with sidecar should do about 1,000 miles per gallon of oil, and a 3½ h.p. solo single about 2,000, under similar conditions to those described.

I rather attribute the remarkably low fuel consumption of this machine to the excellence and steady working of the automatic lubrication system. The engine is always perfectly lubricated, with the result that it cannot be made to show the faintest symptom of overheating—even if driven for miles full out on low gear over some almost interminable mountain pass.

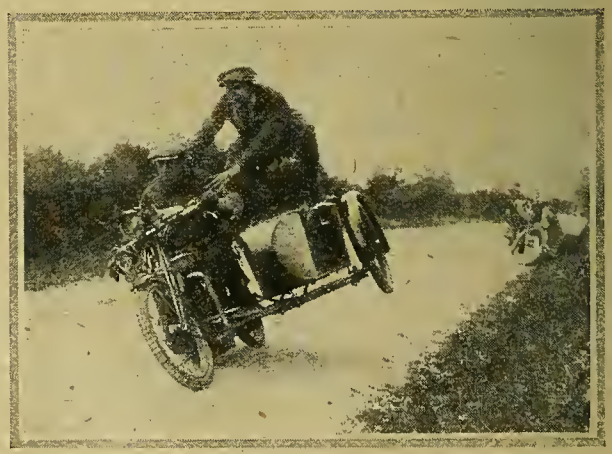
The machine is an all-chain model, fitted with B. and B. carburetter. It has proved absolutely reliable under really adverse conditions, runs exceedingly smoothly, and if judiciously handled is not particularly prone to spells of four-stroking.

Experience with Heavy Fuels.

It may be of interest to add that I have fitted the carburetter with a very efficient hot air intake, which, though it rather increases the noise from the engine, enables one to use a heavy fuel quite satisfactorily. In the early winter I used always to run on half petrol and half substitute. The engine pulled better and ran better when warmed up on this mixture than on petrol, but it would not paddle off when cold, and sometimes, if left out in the frost, I experienced difficulty in starting.

The only point I do not like about the Velocette is the 24in. wheels, which bounce badly over present-day pot-holes. The engine is the best I have had to deal with for town hack work. The low compression renders it easy to paddle off, gives slow running, and in conjunction with the port design, accounts for the machine being a particularly sturdy top-gear climber. It is not so fast as many two-strokes I could name, but for comfortable riding, reliability, and particularly economy. I have not as yet come across its equal.

CHINOOK.



I. Cohen, the designer of the Sturmey-Archer three-speed gear, demonstrating on a 4 h.p. Norton the liberties that can be taken with a sidecar outfit without overturning it. It appears that Mr. Cohen's passenger objected to pillion riding as being dangerous!

Even Firing on Flat Twins.

CAPT. LINDSAY bombards me with enquiries and speculations implying that there is a difficulty in obtaining even firing at all speeds on both cylinders of a flat twin, and an element of pathos in his letter suggests that his machine has something radically amiss with it. I cannot help him, other than by assuring him that uneven firing is *not* a characteristic of flat twins, and is not ascribable to long inlet pipes, as one swift thought of a six-cylinder aviation engine might have assured him. In my stable there reside at present a spring frame 1916 Douglas and an A.B.C. Both will misfire a little on first starting in cold weather, and the A.B.C. recovers first, because it has a substantial hot-air pipe. The Douglas carburetter merely has a little leak tube (of about the average petrol pipe bore) from the exhaust into the spray chamber, and so is slower in getting into its stride. But both engines alike fire with absolute evenness on both cylinders under all conditions when once they are warmed up. Capt. Lindsay imagines that the uneven acceleration and uneven slow running, from which he suffers, are connected with the physics of the moving column of air in a long inlet pipe, and especially with "gas reversals." They are very probably due to bad carburation; they may even be due to one branch of the inlet pipe being far colder than the other in his particular case; they are less probably due to mechanical or ignition derangements of a minor character in one cylinder of the machine which he is riding; they might even be due to faulty design of his inlet pipe. But a little thought will reassure anybody that length of inlet pipe offers no difficulties in principle; and a little experience of existent flat twins will show that even firing is quite as easily attained with a long inlet pipe on a twin-cylinder as it is on a six or twelve-cylinder. My own belief is that complaints of uneven firing in multi-cylinder motor cycle engines are often due to unequal tuning of the cylinders, and that uneven lubrication is the invariable cause, excluding rudimentary derangements of the sort which deceive novices.

Over-driving a Baby Two-stroke.

THERE is probably some justice in a reader's contention that it is at least as easy to "dry up" a baby two-stroke as it is to run a baby four-stroke to a standstill. I did not express myself very clearly or specifically, and will restate my point. When once a baby two-stroke has been properly tuned up and run in, it revels in hard work as no other engine does. The B. and B. carburetter people issue a first-rate little booklet of two-stroke tips, in which they encourage two-stroke owners to persevere on this very ground, and with very good reason, for my own machines (especially a Levis, Triumph, and James) have all proved terrors for hard work when once I got them to rights. When they are new and stiff, or when they have an unsuitable plug, they would certainly not average 30 m.p.h. from Hounslow to Marlborough; but when they are run in they will tackle this trip practically all out, though the speed any given model will maintain depends on its power and its gearing. I will not deny that a baby four-stroke may not nowadays be equally amenable, for I have not tested many of this type of late years. I abandoned it several years ago, on the sole ground that its tune depended on too many vulnerable details, especially the fit of the valve seatings and the temper of the valve springs; and, as a consequence, soon after one got it tuned up it began to fall off again. By contrast, the baby two-stroke, once run in, asks for little more attention than decarbonisation, which is usually a very quick and simple job. If necessary, I think most lightweight enthusiasts would put up with a good deal in order to retain the torque and pleasant purr of a first-class two-stroke.

Is it a Record?

I SUPPOSE the sidecar market is really responsible for the growing prejudices against chain-cum-belt drive and in favour of the all-chain drive? I personally have never on any solitary occasion suffered from belt slip with the two-step drive, save only when the belt had stretched so much as to become ridiculously slack. No combination of rain and gradient has ever caused my belts to slip on the generous countershaft pulleys which are practicable with this type of drive; and when I hear of firm after firm showing signs of conversion to the all-chain drive, I can only suppose that sidecar experience is really responsible for the change, seeing that I never have any trouble with the chain-cum-belt, and that I seldom use a sidecar. I have repeatedly run the belt portion of the combined drive for over 1,000 miles without paying it the least attention; and I have never run a chain drive so far without putting in some work on it. I freely admit that it is now possible to make a chain-drive which is as smooth as the direct belt-drive, though I also assert that remarkably few firms can do it, and that I know of none which has absolutely succeeded with a single-cylinder engine. So my contribution to the discussion which "Road Rider" initiates would be that I am thoroughly satisfied with the combined drive, and on the whole prefer it to any other; that I am quite ready to accept an all-chain drive from a first-class maker, but would refuse to accept a free gift of an all-chain machine from any but a crack firm; and that I do not think we should have heard a great deal about the all-chain-drive if it were not for the sidecar men.

THE Critics

Fireside Chats on Motor Cycle Problems

NOT POLITICS, BUT ——?

"TALKING about peace," said the Journalist, pointing the stem of his huge journalistic pipe at the top button of the Manufacturer's waistcoat, "how do you regard the possibility of foreign-made motor vehicles being imported after the war with a tariff of 33⅓%—and possibly free of duty?"

But the D.R. kicked. "No politics, please," he interposed. "Personally, I know nothing about them, the Novice knows less, and the Manufacturer doesn't care a toss now that he is assured of home-produced magnetos. These meetings are rigidly non-political."

The Journalist stated that he also knew nothing about political matters, which was why he usually wrote the political leader in the local daily. "But," he added, "this is not exactly politics, and it is a question which vitally affects the future of the British trade, which we are all anxious to see on top."

At that juncture the Journalist's dog sniffed loudly, not through any contempt of the subject, but because a piece of fluff from the carpet was stuck to his cold, wet nose.

"You want to see a tariff, I suppose?" queried the D.R.

The Journalist nodded. "Certainly," was his simple answer. The D.R. was thoughtful. His judgment as concerned the correct proportion of tariffs was better cultivated with regard to restaurants than imports.

"Thanks, I'm with you," stated the Manufacturer, shaking off his habitual taciturnity. "With me it is a sore point that the Government should allow the import of all sorts of foreign productions, and so rob the country of its legitimate trade."

"We all have our sore points," put in the D.R. "Personally I have several after riding a British 26in. wheel rigid frame over ninety miles of present-day pot-holes. The foreign production, free of tariff, has taught us the value of other systems. It has done a world of good. But, anyway, go on."

The Use of a Tariff.

"Why should foreign stuff be allowed to come in free?" snorted the Manufacturer. "We cannot export in the same manner! We have seen the effect of injury to our business by the system of dumping goods wholesale—light car engines, for instance—and everything before the war tended to German expansion of trade, subsequently to be used as a weapon against us. With the return of peace there will be a rush for new goods, but the British manufacturer will require time to set his house in order. Then—for the period of two years—we shall require every protection possible. Once let the foreigner get in and establish his popularity, and he will take some ousting."

"History repeats itself," put in the Novice, the grey-head of the party. "Everything we hear to-day about foreign motor cycles—especially Americans—was said about pedal cycles during the great boom. The cheap American cycle was going to swamp the world, and there were wild shouts for a tariff. Things went on in the same old British way, and the subject frizzled to cinder."

"Like the Journalist's slippers!" put in the D.R. Then, turning to the Manufacturer, he added—"That a tariff seems right I agree, but this is the point that hurts me. No British twin being available, I decided upon an American, and referred to an old catalogue which showed my choice at £65. Writing for particulars, I found it had advanced 33⅓%. What is the object of a tariff when we ourselves have to pay it?"

"Did you buy the Yank?" queried the Manufacturer.

"Did I thump!" replied the D.R., helping himself to about five hundred of the Journalist's matches. "Considering the difference, I preferred the British goods."

"Then there is your answer!" stated the Manufacturer. "The tariff frightened you into buying a Britisher—hence the protection. Had you bought the Yank the duty would have gone to the Government—merely money circulated. It only goes to prove that the country cannot lose by a tariff, whereas it might gain a great deal."

The D.R. felt like the festive dockhand, who, seeing two boats at the landing, stepped into the wrong one, and hit his jaw on the gunwale of the real one as he sank.

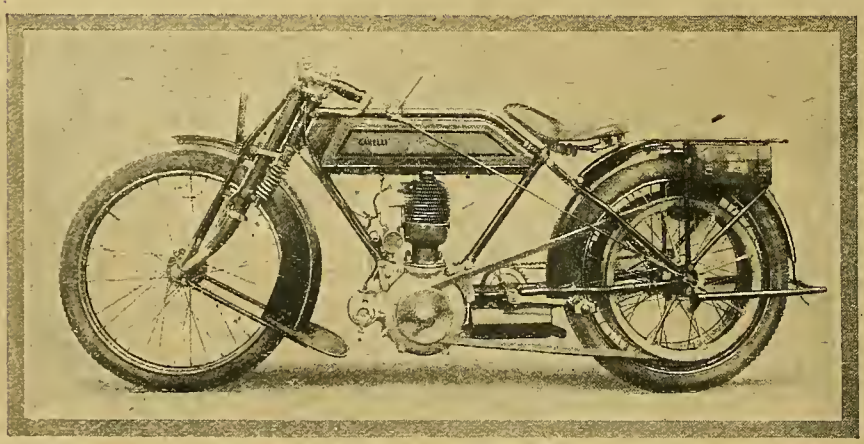
"That doesn't entirely clear the point," put in the Novice. "The American can produce at such absurdly low prices, even with the tariff added, that the British manufacturer is sure to be hit—unless the tariff be at least 50%. A low tariff would be worse than useless. A high tariff would be hard on the poor man, who can only afford a quantity-produced machine, which America alone can give us. Look at the Ford!"

The Journalist said that he had looked at several, and could never distinguish a baker's delivery van from a motor hearse.

Competition Desirable.

"Another point," put in the D.R. "Knock up the prices of foreign competition, and I bet you ten cents the British manufacturer puts up his prices in proportion. The whole thing backs my theory that by imposing a tariff we should merely bleed ourselves."

"Correct! Go up one!" yelled the Novice. "I am convinced that foreign competition is the only thing to keep prices down."



A NEAT ITALIAN TWO-STROKE TWIN.

An experimental machine built by Ing. Garelli, of Turin. The engine is a side-by-side twin, with the magneto enclosed in an extension of the crank case It will be observed that the gear in the hub is a Sturmey-Archer and many other of the fitments are British.

The Critics.—

"You mean to infer," suggested the Journalist, "that a tariff, to be beneficial to the manufacturer, would merely be a nest for him. To be sure he is a cosy beast, quite ready to curl up and go to sleep if we give him half a chance. In other words, he would prefer huge profits and a small output to a huge output for the same profits. That is, he is out to make his pile without undue exertion—like the rest of us."

"Just my point," replied the D.R. "The only way to keep him up to scratch is by allowing foreign competition."

What is Free Trade?

"By the way," drawled the Journalist, "What is Free Trade? I suggest that it has never been known on this earth. Cobden may have had it in mind, but not in fact. You cannot call it Free Trade when goods come into this country free of duty, and the possible duty is promptly added to the price. Compare the price of American machines in the States and here, while if we export machines to the same country *we* have to pay the duty, something like 45%. Where does the freedom come in?"

No one attempted to answer. They were out to discuss motor cycle trade, not politics in general. "England has maintained her place of eminence not by handicapping her competitors, but by the triumphing over them by superior quality," put in the Novice. "Let her continue to do so. Let her expand her greatness," and here he expanded his waistcoat, "not by retarding progress, which is cast integral with competition, but by meeting her competitors on their own ground, and beating them at their own game. She has done it in the past, and we have all flourished. Why not do it again? You can talk about poverty, but the world cannot be without it, and its zenith is sure to be found where success calls her millions together."

They were all carried away by his eloquence.

A Stupendous Problem.

"The question is a stupendous one," the Manufacturer sighed. "I am in favour of a tariff, yet I cannot drop my Free Trade principles. England is the market of the world, and that market has been attained simply by Free Trade. It is a gigantic step to adopt a scheme which may jeopardise the whole trade of the nation. If it is to be done, it is only to be done step by step, slowly feeling our way by half measures, year after year. A little knowledge of the subject is a dangerous thing, and one cannot judge by superficial information. Free Trade has brought us success and therefore we must be very chary in adopting any other policy."

"Shut out foreign competition after the war for three years," put in the Journalist. "In the meantime there will be enough competition internally to prevent inflated prices."

There was a silence. Outside a little newsboy piped unintelligibly, and in hoarse-voiced competition with a second juvenile lower down the street.

"After all," pondered the Manufacturer, somewhat cynically, "it is the man who shouts the loudest who gets the dividend."

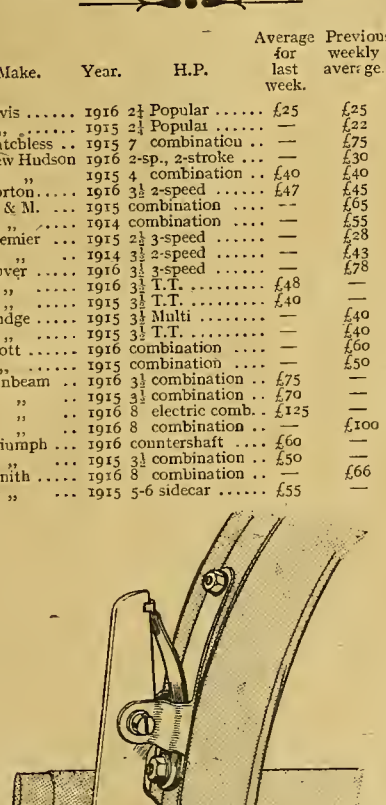
Much more was said, and finally the Journalist's dog, having officially seen the visitors out and attended to sundry other duties, contrived to get under his master's right foot just as his master trod with his left heel on a stray cork.

"No more politics," sighed the man of letters. It was really too expensive in war time.

AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the figures for the preceding four weeks. Thus the general trend of the market is visible at a glance, though many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average, while in other cases advertisers miss many of the essential details, such as year of manufacture, h.p., etc.

Make.	Year.	H.P.	Average for last week.	Previous weekly average.
A.J.S.	1916	6 combination	£95	£96
„	1914	6 combination	—	£56
„	1915	2¾ 2-speed	£44	—
„	1916	4½ combination	—	£90
Alloo	1916	2¾ 2-speed	—	£33
„	1915	2¾ 2-speed	£26	—
Ariel	1914	5-6 sidecar	—	£55
„	1913	3½ 3-speed	£30	—
Auto-wheel	1914		—	£7
Bat	1914	6 3-sp. sidecar	£46	£47
Bradbury	1914	4 2-sp. sidecar	—	£44
Brough	1915	3½ 2-speed	—	£52
B.S.A.	1916	4½ Model K. S-car	£62	£64
„	1915	4½ Model K. S-car	—	£57
„	1914	chain, 3-sp., s-car	—	£55
Calthorpe	1915	2¾ 2-speed	£29	—
„	1915	2½ 2-stroke	—	£23
Chater Lea	1913	8 No. 7 cm	£35	—
Clyno	1915	2-stroke	£29	£25
„	1914	5-6 combination	—	£65
Douglas	1916	T.T. sidecar	—	£49
„	1915	2¾ Colonial	£44	£45
„	1915	2¾ T.T.	£40	£42
„	1914	3¾ T.T.	£35	—
„	1915	4 combination	—	£60
Edmund	1916	2½ spring-f. J.A.P.	—	£50
Enfield	1916	combination	£78	£78
„	1915	combination	£68	£68
„	1916	3 2-speed	£45	£45
„	1915	3 2-speed	£35	£35
H.-Davidson	1916	electric comb.	—	£80
„	1915	combination	—	£69
Humber	1915	6 combination	—	£65
„	1914	3½ sidecar	£35	£35
Indian	1916	5 combination	£67	£57
„	1915	5 combination	£45	£45
„	1916	7-9 combination	£90	£90
„	1915	7-9 combination	—	£70
James	1916	4½ combination	£75	—
„	1916	2-sp., 2-stroke	—	£30
Levis	1916	2¾ Popular	£25	£25
„	1915	2¾ Popular	—	£22
Matchless	1915	7 combination	—	£75
New Hudson	1916	2-sp., 2-stroke	—	£30
„	1915	4 combination	£40	£40
Norton	1916	3½ 2-speed	£47	£45
P. & M.	1915	combination	—	£65
„	1914	combination	—	£55
Premier	1915	2½ 3-speed	—	£28
„	1914	3½ 2-speed	—	£43
Rover	1916	3½ 3-speed	—	£78
„	1916	3½ T.T.	£48	—
„	1915	3½ T.T.	£40	—
Rudge	1915	3½ Multi	—	£40
„	1915	3½ T.T.	—	£40
Scott	1916	combination	—	£60
„	1915	combination	—	£50
Sunbeam	1916	3½ combination	£75	—
„	1915	3½ combination	£70	—
„	1916	8 electric comb.	£125	—
„	1916	8 combination	—	£100
Triumph	1916	countershaft	£60	—
„	1915	3½ combination	£50	—
Zenith	1916	8 combination	—	£66
„	1915	5-6 sidecar	£55	—



A design of stand clip in which the spring is out of tension when the stand is locked up in place—a really good feature.

NEW DESIGN OF STAND CLIP.

THERE are many designs of stand clips for holding the back stand secure to the mudguard, thereby giving the guard some support in addition to performing their own purpose in holding up the stand, but the majority of these clips at present in use are dependent on the tension of a spring or springs, which, being exposed to rough usage in wet, generally fail to function at a regrettably early age. Many of these clips, moreover, are so designed that the act of roughly kicking up the stand tends speedily to weaken their gripping qualities, with the result that the rider constantly experiences the annoyance of a trailing stand.

The accompanying illustration is of a design by Mr. E. H. Miller, of 30, Cromwell Road, Longford Park, Stretford, and aims at eliminating such weaknesses as at present commonly exist in stand clips. The illustration is self-explanatory, and the clip, which is well and solidly made, possesses the advantage that the spring is out of tension when the stand is hooked up in place. Indeed, the only function the spring performs is that of preventing the catch from slipping out of engagement with the stand cross rod, the latter being positively supported by the strong metal catch plate.

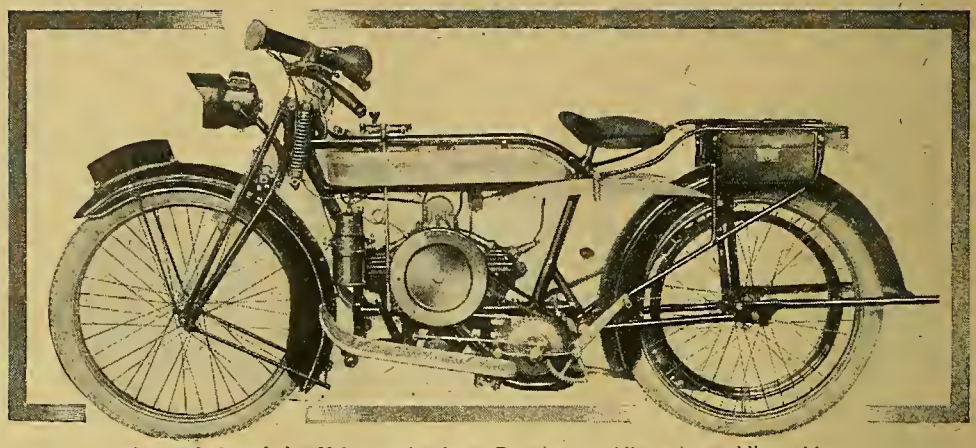
NO MORE SPARES.

A RECENT fire at the Enfield Works, Redditch, totally destroyed the motor sundries stores, together with the large stock of spares and replacements contained therein. Owing to this regrettable event it will now be impossible for the company to supply further spares or replacements for some time, the conditions of manufacture rendering it impossible to renew the stock.

A YEAR ON THE SPRING FRAME DOUGLAS.

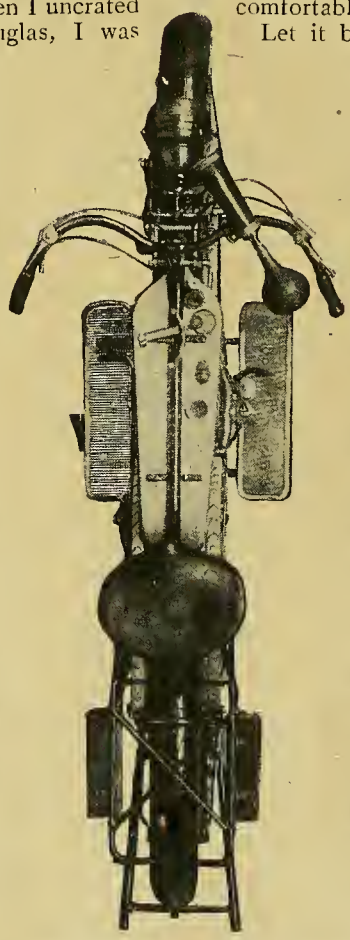
WHAT DOUGLAS RIDERS MAY EXPECT AFTER THE WAR.

By "ROAD RIDER."



Latest design of the 2¾ h.p. spring frame Douglas, providing a low saddle position

THOSE flat twin enthusiasts whose Douglas experience is limited to the pre-war models have a rare treat in store for them as soon as the Hun gives us best. I have always been a great admirer of the rigid-framed 2¾ h.p. T.T. Douglas—the best combination of speed and nippiness with light weight which I have yet handled—and when I uncrated the post-war type of spring-framed Douglas, I was a little dismayed to find that the familiar low saddle position had been sacrificed, and that the weight had risen quite appreciably. Any hankering after the lost features rapidly evaporated when I took the road. The Douglas has always been a very fast machine for its power; but no sensible owner dare utilise its full paces on bad roads, because of its lightness. The new model is bound to be the lightest fully sprung machine on the road for some time to come, and it is so beautifully insulated from road shocks that it can be driven really hard even on our modern war-scarred highways. The long flat rear springs rule out all ordinary bumps, and damp down oscillations due to atrocious ruts until the rider feels nothing worse than a gentle rise and fall; they have never transmitted anything approaching a real jar to my spine except over broken stone on farm tracks. The front fork has been redesigned—rear springs always make manufacturers dissatisfied with the standard front forks; and both ends of the machine are now admirably sprung. Later models than mine have a pan seat providing the original low saddle position, plus a marked reduction in weight. Proper insulation from road shocks is bound to exert a great influence on the trend of the industry. So long as it was impossible to combine speed, low weight, and real comfort in one and the same design, solo riders would consent to yank about machines scaling up to 3 cwt. apiece in extreme instances. Whether the heavyweights will survive when we are offered 50 m.p.h., 180 lb., and no bumps is a question to be answered in days to come. We have had plenty of reliable and efficient lightweights in the past; we have never before been offered lightweights which were really fast and really comfortable.



Aeroplane view of the spring frame Douglas. Observe the taper tank, position of pedals, pan seat, and cross pieces of carrier.

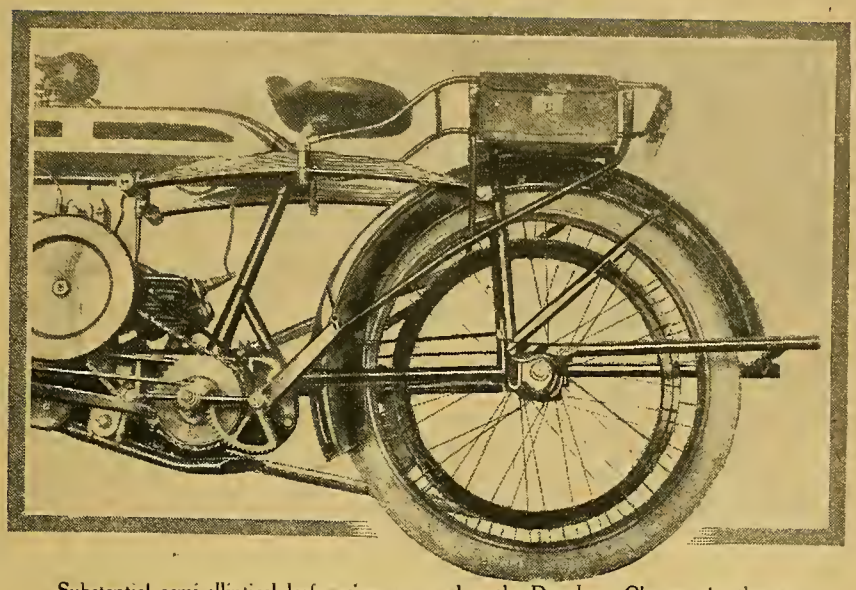
Let it be added that the post-war Douglas will surpass its predecessors in other points as well as that of comfort. The engine, to use an Americanism, has been "brisked up considerable." Unless impressions deceive me, it is now capable of quite a few extra revs., and, in addition, it will throttle down more obediently. Nor has its designer sacrificed the ability to tug hard at low engine speeds on a high gear, a feature which is not too common on flat twins. I lent my machine to an enthusiast, whose own jigger is a somewhat stolid two-speeded lightweight; and, after twenty miles of very hilly country, I asked him what he thought of it. For some while he could do nothing but smile; when he at last became articulate, he had two remarks to make; the first was that he had always previously imagined the road in question to be very bumpy; the second was that he did not think the lightweight was foaled which could do it on top gear as the Douglas had just done. The machine has chiefly been employed in clambering up and down precipitous cart tracks leading to isolated farms; in other words, over the sort of unmapped bridle paths which the A.C.U. would love to use for a "secret route" if it were not afraid of a strike among the competitors. Thanks to the kick-starter and low bottom ratio, the Douglas can get away from a standstill on really stupendous gradients; and, thanks to the spring frame, a twenty-miles trip over such by-paths is not

A Year on the Spring Frame Douglas.—

unpleasant. The toolbags are capacious and the supply of special tools covers every conceivable job. Reliability even under rough usage is of a very high order.

An Improved Model.

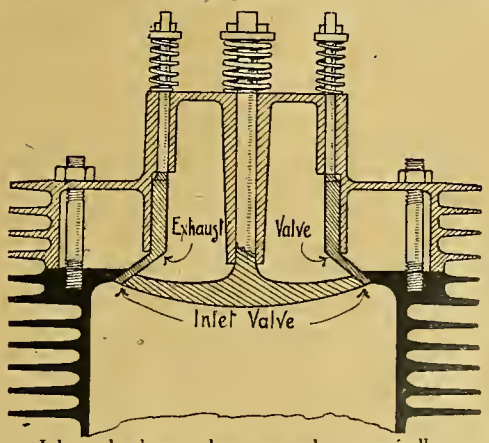
The Douglas design herein referred to represents the stage of perfection reached in 1916, but the company has gone ahead developing and improving details where possible, as is their wont, and the photographs accompanying represent the 1917 design. Various minor improvements have been effected since the spring frame Douglas was first described in *The Motor Cycle* of November 25th, 1915. The anchorage for the cantilever springs has, too, been considerably improved, whilst by the adoption of a pan seat a lower riding position is possible.



Substantial semi-elliptical leaf springs are used on the Douglas. Observe also the seat and carrier construction of this modified design.

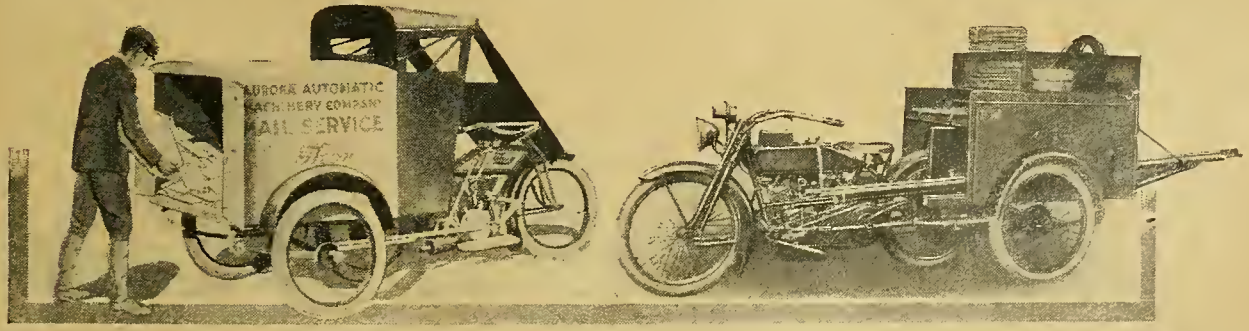
CONCENTRIC VALVE ARRANGEMENT.

WE are accustomed to think of inlet and exhaust poppet valves as being complete and separate fitments, but a method of combining the two has been patented by Mr. E. C. Ward, of East Ham (Patent No. 104,130). This construction is plainly shown in the accompanying sketch, where it will be seen that the exhaust valve is tubular in shape, terminating in rods to which are attached the closing springs. This tubular exhaust valve also forms the seating for the inlet valve, which is of the usual form and carried on a central stem.



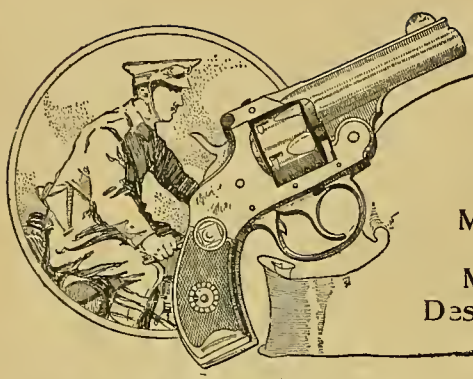
Inlet and exhaust valves arranged concentrically.

A great advantage of this form of construction is that the cool incoming gases will very materially assist in cooling the hot exhaust valve, and will at the same time be thoroughly vaporised. As shown in the drawing herewith, the cylinder must be detached before the valves can be removed for grinding, but they might easily be carried in a detachable head instead of in a detachable casing. Neither the ports nor the valve gear are shown in our illustration. The concentric valve is by no means new, a number of designs having appeared during the last few years. It is strange that they make no real progress—that is commercially—and firms who formerly used concentric valves of certain designs later reverted to the separate inlet and exhaust valve. The patentee, who is now in the Army, is anxious to meet with some maker who will take up the manufacture of the valves.



AN OPPORTUNITY TO ECONOMISE IN LIGHT GOODS DELIVERY.

Commercial motor cycle carriers are now receiving attention in the States for light goods delivery. The design favoured is the tricycle pattern, on the lines of the Cygnet car illustrated. In this country, of course, sidecarriers are preferred.



MILITARY NOTES.

Motor Drivers in the Infantry—Official Statement.
Motor Cyclists and the Air Services.
Despatch Riders and the Dangers they Run.

THE PRICE OF A "TANK."

MR. EU TONG SENG, a member of the Federal Council of the Malay States, has made a gift of £6,000 to the Army Council for the purchase of a "Tank."

WORK OF VOLUNTEER MOTOR CYCLISTS.

THE article which appeared in *The Motor Cycle* of March 15th, embodying suggestions upon "The Work of Volunteer Motor Cyclists," has been considered by Maj.-Gen. D. C. F. Macintyre, C.B., commandant of the National Motor Volunteers, and as a result Mr. S. W. Phillpott has received a letter expressing Maj.-Gen. Macintyre's favourable impression of the proposals.

WELL-KNOWN MOTOR CYCLIST MARRIED.

LT. CYRIL PATERSON, M.C., S.W.B., attached R.F.C., was married on the 20th inst. at St. Mary's Church, Caterham, to Miss Isobel Mary Cappon. Lt. Paterson will be remembered by numbers of our readers as a skilful rider of a Moto-Rêve and of many other makes of machines. For some time he was in partnership with Victor Wilberforce, now Flight-Commander, R.N.A.S., in his motor business at Caterham. Paterson has won not only the Military Cross, but also the Médaille Militaire, and has seen fighting in Gallipoli, Salonica, and France. He is now attached to the R.F.C.

MOTOR DRIVERS IN THE INFANTRY.

MR. MACPHERSON, replying on behalf of the War Office in Parliament last week to discussions on the Army Estimates, stated that he would put before the proper quarter the representations that had been made that no skilled mechanics from the Army Service Corps should be used in the firing line or the front line trenches, but there were tremendous difficulties; strong representations had been made that physically fit men in non-combatant services should be used for the more strenuous life of the trenches. He did not think that policy could be neglected. It was the duty of the War Office to put these able-bodied men into the front line trenches or the firing line. They were able now by the use of women and of men who were over military age to release many thousands of men for that purpose.

Referring to the question of medical examination, he said it was the intention of the War Office—whether immediately carried into effect or not—to alter the classification. At present there were classes A, B, and C with various sub-classes. The proposal now in favour with the War Office was to alter the categories to two—A and B. Class A would probably consist of men fit for general service, and B of those not fit for general service.

A TRIALS RIDER IN THE AIR SERVICE.

THE name of Sydney R. Axford will be known to thousands of our readers on account of his consistent performances in competition on road and track spread over a period of years. Axford is now a lieutenant in the Royal Flying Corps, and, prior to the war, probably his latest achievement of note was the winning of *The Motor Cycle* Trophy at the Doncaster Petrol St. Leger in June, 1914, when, riding a 3½ h.p. 500 c.c. T.T. Matchless, he covered the half-mile from a standing start in 36⅕s. = 49.7 m.p.h.

Lt. Sydney R. Axford, R.F.C.

Lt. Axford was very soon in the Services, enlisting in the R.N.A.S. in 1914 as an Air Mechanic. He was at Dunkirk, acting as a despatch rider, at the time the Germans were dropping 17in. shells in that port from long range. Again as a D.R. he went to the Dardanelles, and was invalided home from that ill-fated battleground in December, 1915. Later, he was appointed lecturer at the Crystal Palace R.N.A.S. School of aero instruction on internal combustion engines, magnetos, carburetters, etc. It was in May, 1916, that he obtained a commission in the Royal Flying Corps, and has since been in charge of M.T. workshops and Renault engines.

WATERPROOF HUBS.

EXTRACT of letter from Sgt. Howard R. Lane: "I read in *The Motor Cycle* every week requests for improvement in certain details of the present-day motor. I wonder when we shall get some of the improvements. I have not been able to find that waterproof hub yet, but am living in hopes. It is hard to describe the condition the roads are now in since the thaw. Sidecar machines have a terrible time of it. The ruts in the roads are something like two feet deep, and the under tubes on the sidecar chassis simply push the earth along.

"I am pleased to say that I am very fit, but am longing for the old days again."

A D.R. AND FLYING.

F. C. NORTH, the Ariel rider, is still a despatch rider in the Royal Engineers, Signal Section, having been in France since 1914. As a practical man, he has been put to all sorts of engineering work in addition to riding a motor cycle, and as a matter of fact recently completed the installation of an electric lighting and pumping plant in a big château. During the winter North had the misfortune to put out his knee, and a sojourn in hospital for a couple of months was the result. Cpl. North's great ambition is to fly, and undoubtedly with his experience and nerve he would be an ideal man for the Royal Flying Corps, a section which has already attracted so many of our keenest motor cyclists.

RIDERS of B.S.A. Motor Bicycles appreciate the value of the B.S.A. Trade Mark—the Three Piled Rifles—which is acknowledged the hall-mark of perfection in motor cycle construction. For over fifty years the reputation of B.S.A. quality has been growing, and to-day no name stands higher in the motor cycle world.

B.S.A

MOTOR BICYCLES

For Solo or Sidecar

1917 CATALOGUE OF B.S.A. MOTOR BICYCLES NOW READY.

THE BIRMINGHAM SMALL ARMS CO. LTD., BIRMINGHAM.

B.S.A. Cylinder Oil good for all motor cycle engines.

B·S·A

Why Dunlops?

DUNLOP MOTOR CYCLE TYRES HAVE SCIENTIFIC TREADS OF SUPERLATIVE RUBBER

Note their points—

1. The large staggered studs in the centre, small ones at sides; each stud is 100% efficient in fore and aft grip.
2. Large rib in middle to support large studs; hence concentration of tread rubber and minimum wear.
3. Small side ribs reinforcing side studs, giving automatic check against side slip.
4. The more you lean over the better you grip.
5. When on the straight the centre studs carry the load; this means *speed.*

EVERY OUNCE OF RUBBER HAS ITS JOB—THERE'S NO DEAD WEIGHT IN DUNLOPS

DUNLOP RUBBER CO., LTD.,
Founders of the Pneumatic Tyre Industry,
Para Mills, Aston Cross, Birmingham.
OF ALL CYCLE AND MOTOR CYCLE AGENTS.

WHAT TANK D.R.'s THINK OF SINGLES.

FROM two motor cyclist despatch riders attached to the Tanks we have received the following note and the photograph which is reproduced :

D.R.'s FOR THE TANKS.

R. N. F. Wheeler and R. P. Llewelyn, despatch riders attached to the Heavy Section, M.G.C., somewhere in France.

'Enclosed herewith is a photograph of ourselves, both D.R.'s to Headquarters, Heavy Branch, Machine Gun Corps.

"At last the fine weather is apparently about to commence. Of late it has been terrible, and the roads (?), what with heavy transport and effects of the thaw, have been practically impassable. To ride over a ploughed field would in some cases be easier. However, our Triumphs (with front fork spring well supported with a strap) stick it well. Soon there will be heaps of hard work for us, but there is nothing like it! Everyone is in tip-top condition, and just waiting for our 'final knock-out blows to the Boches.'

"*The Motor Cycle* reaches us regularly every Tuesday, and is much sought after. The correspondence 'Single *v.* Twin' is most interesting, and I will just say a few words in favour of the single. Our 4 h.p. singles will take us anywhere over any kind of road; they give plenty of power; when in tune 45 to 50 m.p.h. can be attained on a good road. With straight bars they are comfortable enough to ride for fast touring; vibration is quite a minor item, and is not worth considering; and also when stuck in a hole 12in. to 18in. deep it is possible to lift the machine out. Of course, a three-speed gear and handlebar clutch control are essential. Now, considering all these favourable points as regards a single, what more does the average rider at home want under first-class conditions? I have ridden twins, and will say the slightly sweeter running is an advantage, the reserve of power and heavy roar of the engine very nice, and, of course, the extra speed that can be attained; but, then, in England for how long can you let a big twin have full throttle? Of course, in the early morning one can have bursts of speed on the Brighton Road and Portsmouth Road. Putting speed merchants aside—whose percentage is not at all large—does the average motorist want anything faster, more comfortable, or reliable than a Norton, Rover, or Blackburne, and others besides? Any of these are more than fast enough for English roads and magistrates, whether ridden solo or with a sidecar.

"It was through the medium of the 'Blue Cover' that we got into the M.M.G.S., and we have both two and a half years' service each, and going strong.

"Wishing *The Motor Cycle* and yourself the best of luck, REG. N. F. WHEELER, D.R., and R. PENDEREL-LLEWELYN, D.R."

A VARIETY OF CONDITIONS FOR DESPATCH RIDERS

TWO despatch riders attached to a R.E. Signal Company write us on the subject of the conditions under which despatch riders at the Front carry out their duties. As is well known, the conditions vary to a great extent, and many readers marvel at the conflicting evidence of the dangers involved. We have previously drawn attention to the fact that whilst certain D.R.'s are quite out of danger others attached to an advanced headquarters are quite near to the firing line, and their work far more dangerous. A letter just received, endorsed by a couple of D.R.'s, bears on this sub-subject, and as it may help to clear the air, it is published *in extenso*.

"From time to time we have noticed in *The Motor Cycle* letters relating to riding conditions in France. From the tone of some of these letters the people at home gather an entirely mistaken idea of the conditions here. This state of affairs is brought about mainly by the fact that these letters emanate in many cases from individuals who have never been farther forward than one of the base towns.

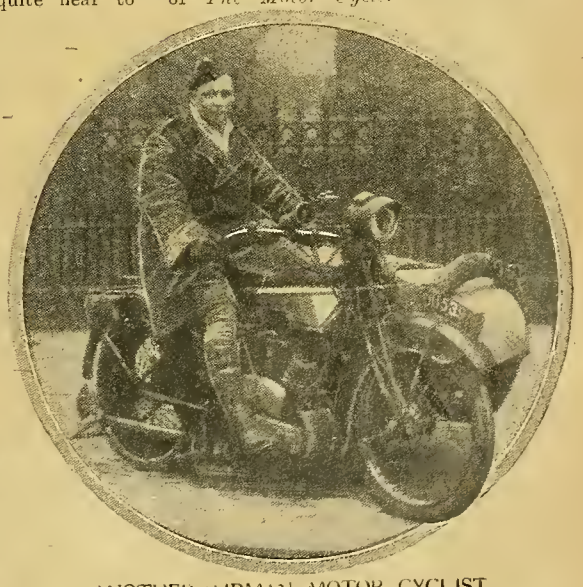
"We have read glowing accounts (fictitious sometimes) of thrilling deeds by D.R.'s, but we are sorry to say we cannot by any stretch of imagination believe most of them.

Pot-holes Only Six Inches Deep!

"During our fifteen months' riding experience out here we have never been unfortunate enough to traverse a road with pot-holes more than six inches deep, and even these roads are rare. Such can, of course, be found, but, needless to remark, they are not used as traffic roads. Can you imagine the front wheel of a bicycle dropping into an eighteen inch pot-hole and bumping out again? We cannot. We have seen photographs of the 'trusty mount' on the most appalling roads, but we know of one case where mud and boulders were strewn in the *lane* in preparation for the photographer. Such happenings, we hear, are not infrequent, and we are at last moved to write this letter as a protest against these scaremongers. We consider it rather a low-down trick to add to the already overwhelming anxiety of the people at home. Why is nothing said about the beautiful, straight, wide roads which abound close behind the line, and which are used as much as the lower class roads? It would be a joy to use something hefty in the way of twins over some of these good roads."

MACHINE GUNNER'S TRANSFER.

WE have received a letter from Gunner L. P. Upton (formerly of Birmingham), whose father is the designer of the Allon two-stroke and certain accessories prominent in the motor world. Gunner Upton has been out at Salonica for some time, and was booked for the Armoured Car Section, but was unable to take it up on account of falling sick with malaria. He mentions that he had a surprise meeting with A. J. Ware, the Indian rider, who was also in hospital with malaria. They returned together. Gunner Upton, being a machine gunner, is attracted by the Tanks, and is now anxious to transfer to the Heavy Branch, Machine Gun Corps. He enlisted in September, 1914, since when, he tells us, he has never missed a single week's issue of *The Motor Cycle*.



ANOTHER AIRMAN MOTOR CYCLIST.

2nd Lt. F. M. C. Houghton, R.F.C., the organiser of the successful All-Khaki and the Naval and Military Race Meetings at Brooklands in the late summer of 1915.

CURRENT HAT

TIMES TO LIGHT LAMPS.

GREENWICH TIME.

Mar.	29th	... ...	6.55 p.m.
,,	31st	... ...	6.58 ,,
Apl.	2nd	... ...	7.2 ,,
,,	4th	... ...	7.5 ,,

To Regular Readers.

Readers are again strongly urged to hand a written order to their newsagent for a regular copy of *The Motor Cycle*, otherwise disappointment is bound to occur. A printed order form will be found on another page of this issue.

Coming of Spring.

This has indeed been a memorable winter. On the opening day of spring, on the crest of Edge Hill, we ran into the worst snow blizzard we have ever experienced. It was almost impossible to ride against it, and in a minute or so the machines, their riders, and, indeed, the whole landscape, were white with thickly frozen snow.

Oxfordshire Motor Volunteer Corps.

An enthusiastic meeting was held in Oxford on Saturday, the 17th inst., when General Macintyre explained the object and purpose of the National Motor Volunteers, and also replied to the many questions addressed by some of those present. A splendid response was made to the call both by car owners and motor cyclists. The first meeting and drill of the Volunteers will take place within the next few days.

Pooling of Oil.

A writer in the *Times* makes an important statement with reference to the immediate supplies of oil and petrol, and suggests a pooling of the large companies in a similar way to which the smaller concerns have been combined in various towns at the suggestion of Tribunals. By pooling their stocks, tonnage storage depots, and transport facilities, many men could be released for the Army or for National Service.

Honesty the Best Policy.

The Petrol Control Committee are issuing notices to the effect that certain petrol licences will not be renewed. Many riders have taken this notice to refer to their driving licences, and are now bemoaning the fact that they will not be able to use up their carefully hoarded little stock. One rider, indeed, receiving this notice, and whose driving licence is on the point of expiring, promptly sold his stock to a friend, who had been sufficiently honest to draw only what he actually required. Well done, honest friend!

A Steam Light Car.

It is possible that, after the war, competition riders in A.C.U. trials will find themselves competing with a steam-driven cycle car. The designer of such a machine, who is now serving in the trenches, hopes to participate in these events, if the A.C.U. will permit the entry. The "Stella Steamer," as the car is called, is described by its designer in this week's issue of *The Light Car*.

Adjustment of Mechanical Pumps.

Last week it was stated in a paragraph on this page that riders whose machines are fitted with mechanical oil pumps will probably find that these will require slight adjustment now that the weather has become milder, otherwise smoky exhausts may ensue. Subsequently we have received a letter from Messrs. Best and Lloyd, Ltd., in which they say, "We think it will be of interest to you to know that this has proved to be needless as far as our own mechanical pump is concerned, as varying viscosity due to weather or any other conditions does not in any way alter the quantity of oil delivered to the engine."

Lubrication and Atmospheric Pressure.

We fail to see, however, how the viscosity of the oil can fail to affect the working of a pump which is dependent on atmospheric pressure. The very fact that the charges of oil have to pass a ball valve in order to gain the pump is in itself sufficient to render the pump susceptible to the viscosity of the fluid, and the resistance in the pipes must have a governing effect.

Age 14 To-day!

This issue celebrates the fourteenth birthday of *The Motor Cycle*. The first issue of this journal appeared on March 31st, 1903, and for a time the price was 2d.—the present figure. Since its advent *The Motor Cycle* has appeared every week without interruption, and, besides having helped to live down the strong prejudice which existed against motor cycles during the period of 1904-8, fostered and developed an industry which was subsequently to prove of inestimable value to the nation in this hour of need.

The newly devised badge of the motor cycle divisions of the U.S. Army. The insignia is black and orange, and has a spread of 4½in.

SPECIAL FEATURES.

MOTOR CYCLES FOR THE DISABLED.
ECONOMICAL TWO-STROKES.
A YEAR ON THE SPRING-FRAMED DOUGLAS.

Petrol for Parsons.

The Petrol Control Committee hopes to be able to continue to allot a small quantity of petrol to clergymen who require a car or motor cycle for their professional duties.

Oversize Pilots—A Common Error.

The size of a pilot jet should be decided with the engine hot, otherwise it will permit too much petrol to pass when ticking over in traffic, with resultant wastage and probably eight-stroking. Judging by ear, many users of pilot jet carburetters are wasting precious fuel through oversize pilots.

The Petrol Outlook.

We do not consider the outlook as regards petrol supplies to be so gloomy as many of our readers imagine. Unless Germany's submarine warfare becomes still more active, which is hardly likely, petrol stocks are sure to accumulate in spite of the enormous quantity used by the Army and Navy. This may mean that at the end of a few months the Petrol Control Committee will see fit to release supplies—the tax of sixpence a gallon being something by way of an inducement.

The Arbuthnot Trophy.

The following is an extract from a letter we have received from Lady Arbuthnot, who, as announced in the issue of the 22nd, has received a replica of the Arbuthnot Trophy, which, after the war, is to be offered in a competition to be organised by the A.C.U.: "The more I look at it (the replica of the trophy), the more I realise what a true impression it gives of my husband. Nearly all his spare time when on leave was spent in motor cycling, and certainly his happiest days were those on which he had enjoyed a good run on his Triumph or his Douglas; and though, I fear, I sometimes grudged the hours spent on his favourite sport, I know that to him it stood for a great deal more than a mere pastime, and that he believed it to be the finest possible training for the eye and nerve. May I beg you to accept . . . for all those who contributed to the trophy my sincere appreciation of the tribute paid to my husband's memory, and at the same time my heartfelt thanks for their kind thought in presenting me with such a beautiful replica."

The National War Funds.

At the week-end the principal war funds stood as follow :

The Prince of Wales' Fund (distributed £3,564,508)	£6,046,581	0	0
British Red Cross Fund	6,391,376	5	8
Tobacco Fund	127,372	0	0

R.F.C. Officers' Tunics.

From April 15th, officers of the Royal Flying Corps will not be permitted to wear infantry tunics. A recent Army instruction bears upon this question, and requests that all captains and lieutenants wear the R.F.C. double-breasted tunic from the date named.

Summer Time.

Summer time is to be reintroduced this year throughout the United Kingdom at two o'clock on the morning of Sunday, April 8th, when the clocks will be put forward one hour, and ending at two o'clock on the morning of Monday, September 17th.

A Rich Man's Sport.

Under the heading of "Petrol Wasters," a Liberal daily, referring to the Lingfield race meeting, remarks : "Racing is becoming more than ever a 'rich man's game.' There were not more than 1,500 people present, and nearly all had arrived by car."

Repairing Pot-holes.

We would point out to the roadway authorities that the method of "repairing" pot-holes simply by filling them with small, loose rubble is really worse than useless. The loose stones are speedily thrown out by passing traffic and littered over the surface, their sharp points and edges being extremely detrimental to the tyres of rubber-wheeled vehicles, while the pot-hole remains in its original form It would seem that some binding material must be mixed with the rubble if the pot-holes are to remain filled.

Riding against "Time."

Sgt. Park, of the Cumberland and Westmorland Police Force, who is a keen motor cyclist, was complimented by the magistrates at Milnthorpe Petty Session on the capture of a motor cyclist who was wanted—a Danish "engineer," residing at Glasgow. The police received warning by telephone that the man, who was suspected of having stolen a missing sidecar outfit valued at over £100, had been traced along the road southward towards Manchester, and passed through Penrith at 3.15 p.m. Both the Borough and County police missed him as he went through Kendal, and the intelligence was telephoned to Milnthorpe, where, by means of a smart ruse, Sgt. Park was just in time.

An Alien Friend!

It was then 4.40, and the man was careering through the village at a mad speed, but we are not informed as to the nature of the "smart ruse" by which Sgt. Park succeeded in stopping him. The prisoner's identity papers, driving licence, and "certificate of registration of an alien friend" were produced, and he was remanded to await an escort back to Glasgow. After the Court, Sgt. Park conveyed the prisoner and his escort in the motor cycle and sidecar to the railway station, so that the whole affair resolved itself into more or less of a motor cycling event.

D.R.'s Wanted.

There are vacancies for despatch riders in the Royal Engineers' Signal Service. Men must be A category and at least eighteen years and eight months of age.

Books for the Troops.

Sir Douglas Haig has stated in a letter to Sir Edward Ward, chairman of the Camps Library, the troops greatly need and appreciate reading matter. Books and periodicals should be handed across the counter of any post office unwrapped and unaddressed.

Six Months' Petrol After All.

The "surprise" licences for motor cyclists have created a good deal of satisfaction. We forecast that the Petrol Committee's action will check the downward tendency of second-hand prices, a situation which *The Motor Cycle* alone boldly faced last week by quoting actual figures.

The Ever Adaptable Sidecar.

The Irish Cyclist and Motor Cyclist of March 14th contains the following amusing passage : "The sidecar makes an excellent receptacle for the gun and game of the sportsman, especially if he has reason for making no ostentatious display of his prowess, or when his shooting is done in the close season. For safety's sake, however, it is highly desirable that, under such circumstances, means should be taken to hide or alter the registered number of the machine. It was his omission to attend to such a detail that led to the discomfiture of a Leeds contractor with sporting tendencies strong enough to tempt him forth to go partridge shooting in February."

Heavy Fuel Flashpoints.

Messrs. C. Binks, Ltd., have recently written us to the effect that they receive numerous letters asking for the specific gravity of Binks fuel, and suggest that we publish the following passage for the enlightenment of heavy fuel users :

"The specific gravity is apparently the only point which interests purchasers of substitutes, but it is not really the important point. The chief thing—in fact, the only thing that really matters—is the evaporating point. The temperature at which the fuel begins to distil, and the final temperature at which it all goes over, are the figures for which the purchasers of substitutes should ask."

The Petrol Famine.

Notice had been given that visitors could not proceed to the course of the "War National," held at Gatwick, by rail, and the result of this prohibition was quite up to expectations. By the time the first race started the outside paddocks were crammed with cars, and by noon the ground in the immediate vicinity of the stand was so crowded that the later arrivals had to be parked down the road leading to the course.

The Times estimates that the consumption of petrol on this race meeting amounted to 2,500 gallons. Most of the cars, states our contemporary, were of 15-20 h.p., and even up to 60 h.p. Most travelled something like sixty miles, and a fair proportion of the private cars carried only one or two, though other hired vehicles were crowded.

Why Restrict Home-produced Fuels?

There is a growing feeling that the Government should be urged to remove the embargo on *home-produced petrol substitutes*. Why they were restricted at all is a mystery to most people, since they cannot affect the shipping question in the slightest. Surely events have amply demonstrated that the Government should do all in its power to encourage the production of home-produced fuels.

Our Blind Heroes.

The support of blinded soldiers and sailors is a cause which, we are convinced, will meet with the approval of warm-hearted people all the world over, and we trust that the following appeal, sent us by Sir Arthur Pearson, will bring more than passing thoughts of sympathy from some of our readers :

"If you who read this think that the fight which Britain is making is a just fight, if you honour and respect the men who have represented you in that fight, if you have sympathy for those who in thus representing you have suffered so terrible a deprivation as the loss of their sight, you will send a contribution, be it large or small, be it in cash or kind, to the Sec., Blinded Soldiers' Bazaar Committee, 6, Bayswater Hill, W."

British Imports and Exports.

The February Board of Trade returns were delayed, the figures, in fact, being recalled by the Board of Trade.

We notice from the returns just issued that imports of motor cycles still continue, despite the prohibition, their value, with parts, totalling £11,725. The full figures are given hereunder :

IMPORTS OF MOTOR CYCLES AND PARTS.

	1915. February.	1916. February.	1917. February.
Number	501 ..	8 ..	105
Value of complete machines	£20,667 ..	£347 ..	£5,237
Value of tyres parts and accessories	£4,730 ..	£6,341 ..	£6,488
TOTAL	£25,397	£6,688	£11,725

British exports are not quite equal to the figures for the corresponding month of 1916, which month was an exceptionally good one. Appended are the figures :

EXPORTS.

	1915. February.	1916. February.	1917. February.
Number	474 ..	1,133 ..	882
Value of complete machines	£20,006 ..	£49,960 ..	£44,478
Value of tyres, parts and accessories	£15,424 ..	£30,613 ..	£21,664
TOTAL	£35,430	£80,573	£66,142

Our exports of motor cycles, parts, and accessories for the two months ending February were :

1915.	1916.	1917.
£81,126 ..	£150,638 ..	£145,272

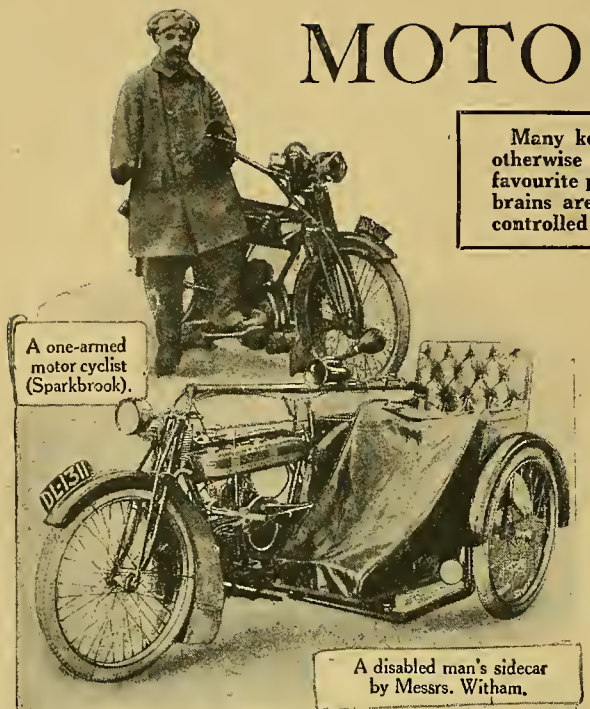
We cull the following import figures of petrol from the returns, from which a striking increase in the imports will be observed :

PETROL IMPORT FIGURES.

1915. February. Gals.	1916. February. Gals.	1917. February. Gals.
8,036,659 ..	7,522,377 ..	12,257,984
FOR TWO MONTHS ENDING FEBRUARY.		
1915. Gals.	1916. Gals.	1917. Gals.
15,020,998 ..	14,507,656 ..	25,259,724

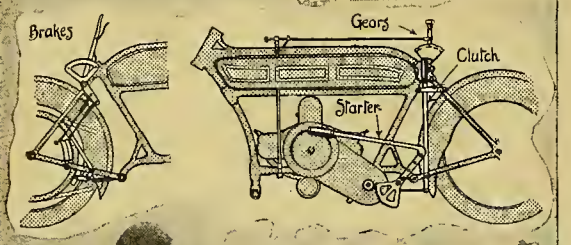
MOTOR CYCLES FOR

Many keen motor cyclists, alas! return from this dreadful war lame or otherwise disabled, and the thought of never being able again to pursue their favourite pastime in the open air must create bitter pangs of regret. But brains are at work devising ways and means to enable motor cycles to be controlled by the partially disabled, and in this article we review a selection—

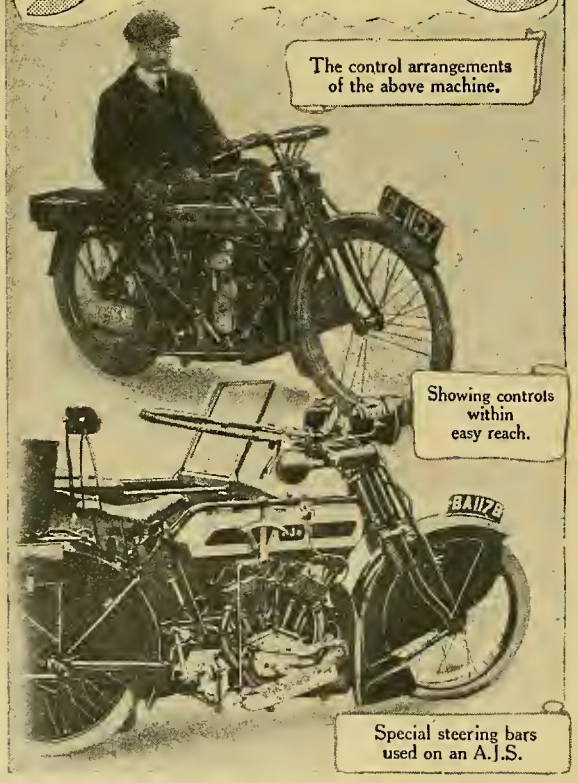


A one-armed motor cyclist (Sparkbrook).

A disabled man's sidecar by Messrs. Witham.



The control arrangements of the above machine.



Showing controls within easy reach.

Special steering bars used on an A.J.S.

THE question of the adaptation of motor cycles for the use of lame men is one, unfortunately, of peculiar interest at the present time. There are scores of motor cyclists who, after serving their country, will, alas! return home minus a limb, or with ailments which will prevent them participating in their old pastime in its fullest or most vigorous form. But they need not give up hope; brains are already at work evolving ideas to benefit these warriors who are probably at the moment nursing a healing limb and mournfully pondering on the good old days they have had in the saddle, the likes of which they think will never be again.

To the lay mind the idea of a man with one leg, or one arm, or a limb slightly paralysed, or even a deaf man having control of a motor vehicle, is the height of folly. But it is not likely that legislation will be brought about, as some people imagine, to prevent driving licences being issued freely to reasonably competent men. After all, the percentage of accidents due to men who are lame or otherwise incapacitated is very small indeed. Now that devices are being perfected by which badly maimed men may be independent of help in their endeavours to get about the country, it would be hard indeed to deny them that pleasure.

Effective Control.

The primary necessity in connection with the driving of any vehicle is, of course, effective control. In arranging for any device for the use of a lame man this question becomes one of vital importance, and too great a stress cannot be laid upon it.

Assuming the difficulties of obtaining a suitably converted motor cycle and of mounting and alighting be overcome, the first question is that of starting the engine. The majority of motor cycles have kick-starters, and in most cases this method of starting the engine will be found preferable to a handle, though, in certain instances, the latter might be better. How to rearrange the controls for a man who is able to mount the saddle depends on the make of the machine. The obvious suggestion that some of them, say the brakes and the manipulation of the hooter, should be so placed that the passenger could attend to them would not appeal to all—the air of independence would be lacking, and that would not suit many men. In the forthcoming description of converted vehicles there is no sign of co-operated control.

The Types Illustrated.

The vehicles illustrated are all propelled by motor cycle engines with one exception, that of the electric bath chair, and the divergence of type is as great as will be the divergence of the requirements; but, for convenience, they can be divided roughly into two categories.

THE DISABLED.

—of such conversions. Some users speak most enthusiastically of their adapted machines, whether sidecars or "auto-chairs," and any reader more happily situated can well imagine the appreciation and delight of a disabled soldier, or civilian, who had thought that solo trips and progress by motive power were beyond him.

There will be those men who have had the misfortune to lose only a hand or foot, and who will be able to consider the purchase of, or the conversion of, an ordinary type of motor vehicle, and enjoy practically all the benefits to be obtained from them.

In the second list will be men who will require a vehicle of quite a different character. The simple bath chair with an auxiliary power unit attached just sufficient to propel the vehicle at 5 or 6 m.p.h. will be all that is called for.

Converted Vehicles.

But the majority of lame men who have tasted the joy of the open road on a favourite mount will undoubtedly be most interested in details concerning its conversion into a vehicle fit for their use than in any special type.

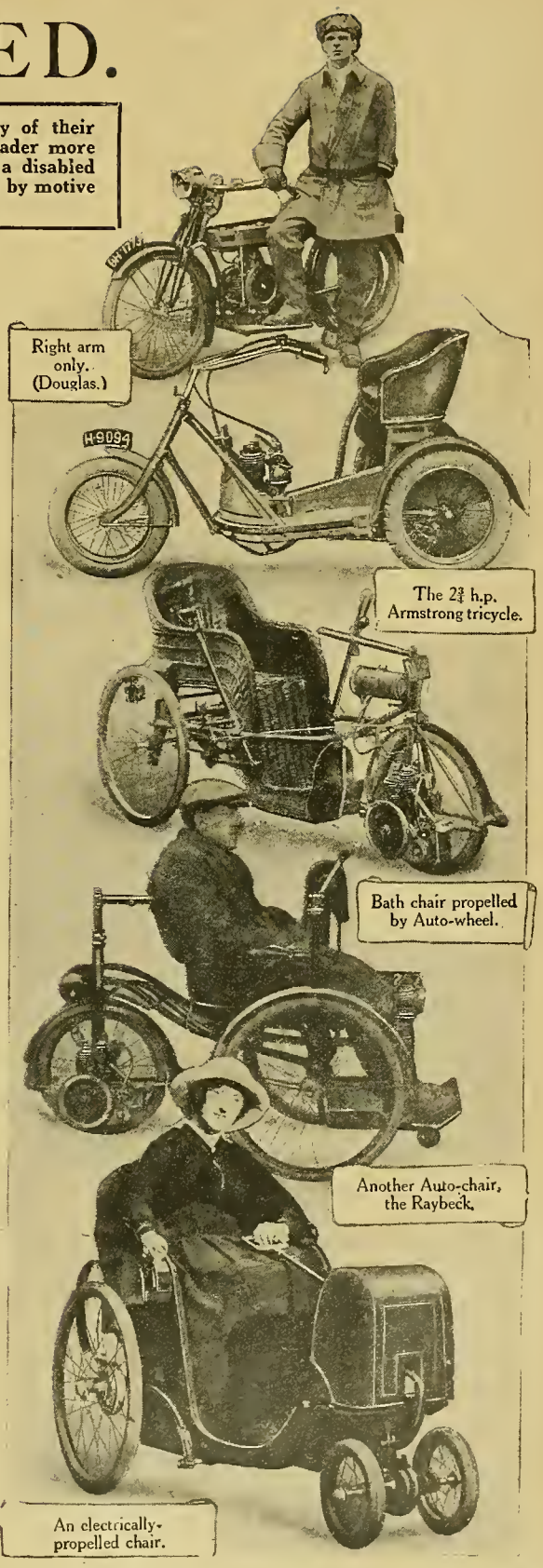
One of the illustrations shows an A.J.S. outfit so converted, and, although almost standard in appearance, it possesses one striking exception. In place of the orthodox handle-bar a hoop has been fixed, which enables the driver to steer with his body when changing gears or when attending to the lubrication, etc. The control levers to the carburetter, exhaust lever, and front brakes are within easy reach of the right-hand grip, the clutch and rear brake being operated from the right footboard.

The owner says he has accomplished some long runs and can easily steer and handle the machine. In this particular instance, the owner had never possessed a motor cycle before, which should surely convince any person, should any person require convincing, of the ease of the manipulation of a modern motor cycle. The difficulty of steering whilst operating levers has been overcome in a most novel though unconventional manner.

In the case where a rider minus an arm prefers to risk riding solo the problem is not easy, although two riders, Messrs. Davis and H. Winston, who have adopted this method are shown. There must always be an element of risk attached to it, perhaps too great a risk for any but experienced riders to take. The former rider had the controls of his two-stroke Sparkbrook brought to the left, leaving the right handle-bar clear. This he had straightened out, and a piece of steel screwed on to provide a rest for that part of the right arm, *i.e.*, to the elbow, which still remains.

Driving from the Sidecar.

By far and away the greatest possibility offered to lame men lies in adapting the controls of a motor cycle so that it may be driven from the sidecar seat. This idea is not new, the practice having been occasionally adopted by riders ever since the advent of the sidecar; but, strangely enough, the idea never became popular. One would have imagined those riders who habitually run their sidecars throughout the


Right arm only. (Douglas.)
The 2¾ h.p. Armstrong tricycle.
Bath chair propelled by Auto-wheel.
Another Auto-chair, the Raybeck.
An electrically-propelled chair.

Motor Cycles for the Disabled.—

winter for business purposes (and there are many who do so) would have preferred to occupy the comfortable sidecar to the exposed position of the saddle.

Up to the present no manufacturer has offered a complete sidecar outfit capable of being driven either from the saddle or from the sidecar, though we have had a number of double-seated sidecars for some time past. So far as steering and control are concerned, the method of controlling from the sidecar seat is a success.

Messrs. Witham Brothers, Newport, I.O.W., have devoted considerable thought to the subject, and after several experiments have evolved methods of control which the writer is convinced will be extensively adopted. The machine used is a three-speed Douglas, and, as will be seen in the photographs, all the controls are within easy reach of the right hand. The gear change quadrant is removed from the top of the frame and fixed to a special lug in a vertical position on the seat-pillar. Immediately in front of the change-speed lever is a long lever for operating the clutch. For starting purposes the step, or kick-starter, is dispensed with, and a long cranked lever fitted, the handle of which is seen close to the flywheel. On the opposite side of the machine, near the change-speed lever, is the principal brake to which is fitted a pair of blocks—one operating inside and one outside the belt drum—giving ample braking effect. This brake is worked by a ratchet lever fitted to a quadrant. The front rim brake is retained, and is operated in the usual way—by a Bowden lever close to the gear-change quadrant. Messrs. Witham Brothers say the Douglas is a particularly suitable machine for the purpose of such conversion, though, of course, there are many others which would serve quite as well, and could be as easily converted. The designer himself uses a similar machine, and, though quite unable to stand, has never had the slightest hitch on the road.

Motor-driven Chairs.

In quite a different category are the vehicles which might be termed invalids' motor chairs. The firm just spoken of have converted several ordinary bath chairs into motor-propelled vehicles by means of the handy Auto-wheel, and the two photographs illustrate how it can be accomplished. With the first experimental model the chair was propelled by the wheel from the rear, but was afterwards superseded by the better method of replacing the steering wheel with the motor attachment.

A similar device has been fitted to the Raybeck invalid tricycle. In this instance, help can be given with the rotary handle should the motor fail or additional power be required to help the engine up an incline.

The Armstrong tricycle, made by Messrs. Armstrong and Co., Goldhawk Road, Shepherd's Bush, W., is a vehicle of 2¾ h.p., and capable of a speed of 20-25 m.p.h. It is simple, neat, and handy, and its design shows considerable ingenuity. The drive is through a single semi-enclosed chain to the back axle. A two-speed epicyclic gear is fitted to the engine-shaft and operated by means of a Bowden lever on the handle-bar. The engine is started by means of a quadrant engaging with the free wheel on the engine-shaft, and operated by a long lever at the side of the vehicle. This machine is not available during the war.

Electric Vehicles.

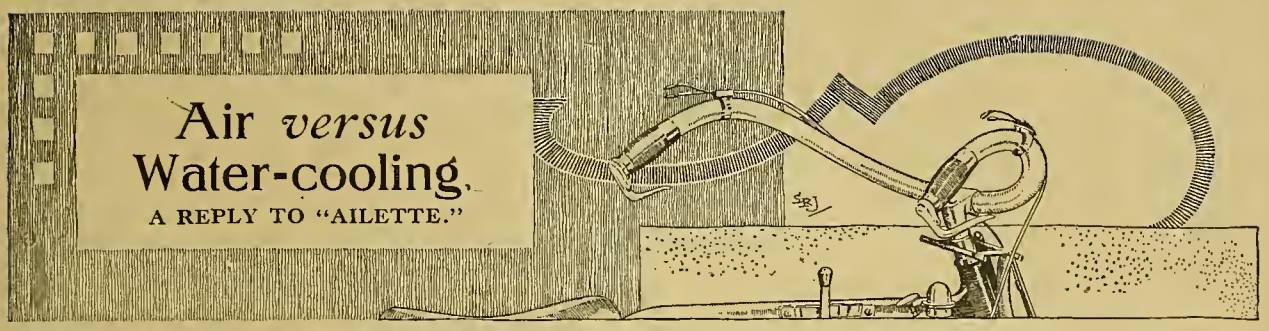
A type of invalid's motor to which, in this country, very little attention has been devoted, is that which is electrically propelled. The most that can be said in its favour is that it is clean, neat, and silent. Comparing the type with those propelled by a petrol engine, it is far more expensive to purchase in the first instance, and recharging the batteries is both costly and inconvenient.

At the moment a really comprehensive list of devices pertaining to vehicles of both the motor chair and converted sidecar type is very difficult to obtain. Many men who have returned from the Front incapacitated are at the moment planning devices whereby they may be able to use their mounts, and no doubt many will be the ingenious systems worked out to suit their needs. None need despair; with a little ingenuity the majority of machines can be altered, and so enable their owners to return again to their old pastime. Even if unable to blind along the straight or tear up a corkscrew hill at speed, they will have the more staid sidecar, on which many good days can be spent when the veil of horror is lifted and when petrol is not the precious fluid it is to-day.

MORE MOTOR FUEL.

THE discovery by Dr. R. Lessing of a new process for the complete recovery of the benzole contained in coal gas, described at a recent meeting of the Society of Chemical Industry, should prove good news to everyone engaged in the motor industry, and not least of all to owners of motor vehicles, whether used for pleasure, business, or transport. Up to the present our principal commercial source of benzole has been the light oils, etc., which are condensed with the tar during the distillation of coal in making coal gas and coke for iron smelting. Although a large proportion of the benzole condenses with the tar, a considerable quantity remains in the coal gas, and it is to this that the gas owes much of its illuminating power when burnt from a flat flame burner. By Dr. Lessing's process it will be possible to recover the whole of this, amounting to about two gallons of benzole for every ton of coal. As the annual output of gas in the London area alone amounts to about sixty thousand million cubic feet, no less than twelve million gallons of benzole could be recovered every year in London. When the whole of the kingdom is taken into account, the quantity it is possible to recover should amount to, perhaps, four or five times this figure.

Although after the war a large quantity of benzole will be required by our dye works for making aniline dyes, there should be a considerable surplus for use as motor fuel; and this should do much to make up for the destruction of oil wells in Galicia and Rumania and for the sinking of shipping, which must render the price of petrol high for some time to come.



Air *versus* Water-cooling.

A REPLY TO "AILETTE."

"AILETTE'S" article on water-cooling for motor cycle engines seems to me to indicate that he wrote from the point of view of the idealist-journalist rather than from that of the practical manufacturer. Anyone who has had practical experience of both systems will admit that it is impossible to dogmatise in a general way on the subject of cooling, and that in considering what system is to be employed in order best to combine economy with efficiency, it is necessary to know:

(*a*) The type of engine that will be employed.

(*b*) The nature of the work that the engine will be required to accomplish.

(*c*) The conditions under which the major portion of the work will be performed.

The average motor cycle engine is, for all practical purposes, not cooled at all, but, since the weight it is required to drag is small, and a comparatively high gear can be employed for general running, the engine runs on a fairly light throttle, and is borne through the air at sufficient speed for all practical cooling purposes. It must be remembered that no sane person wishes to run his mount under Brooklands conditions on the public highway. I am well aware that an approximation to those conditions is attained by those who will attach heavy sidecars to motor cycles not intended to pull them, but it may be taken as a sound axiom that where an air-cooled motor cycle engine overheats through being overloaded, a similar water-cooled engine would be running under conditions not conducive to longevity, even if it displayed no obvious symptoms of distress. Generally speaking, I have never seen a good case made out for water-cooling in the average motor cycle engine.

Fan-cooling.

Special conditions alter the point of view. For example, I may take the A.C. Sociable. Here we have a somewhat heavy vehicle with three tracks, propelled by what amounts to a big single-cylinder motor cycle engine. Apart from the question of design, which necessitates the engine being boxed in, the weight of the vehicle, the type of the engine, and the fact that the vehicle, being provided with two speeds only, has to run normally on a "compromise" top gear ratio, mean that a considerable amount of running is done on what a motor cyclist would consider a heavy throttle. I do not think that this engine—if not artificially cooled—would give satisfaction, even if carried in a position where it would be fully exposed to the air currents. Nevertheless, an A.C. engine in decent trim never overheats, owing to the excellent system of cooling by fans. It seems to me that the efficiency of the average motor cycle engine could be raised considerably without recourse to water-cooling by the provision of some simple form of artificial draught and the incorporation of an outside flywheel.

Where Water-cooling is Desirable.

The comparative efficiency of the two systems could best be expressed as a graph, the lower portion of the curve showing in favour of air-cooling, but a point being reached at which the efficiency of air-cooling compares unfavourably with that of the rival system. The crucial point on that graph is symbolised in my mind by the light cycle car. When one builds a vehicle too unwieldy to permit of pushing off for a start, insufficiently "nippy" to rush sharp ascents, and presenting just sufficient frictional losses in transmission and the drag of four wheels to require a lower top gear than the average 8 h.p. combination, it is without question best to resort to water-cooling. That I have sadly proved in many painful experiments.

Tiny Four-cylinder Engines.

I was really tempted to write this reply by "Ailette's" sigh for the water-cooled four-cylinder motor cycle. I have on several occasions written to you in eulogy of the four-cylinder motor cycle, and I still think it the ideal mount, but to be efficient *it must not be water-cooled*. To be economical, efficient, and compact, a four-cylinder motor cycle engine should be about 800 c.c. capacity, which means that each separate cylinder will be of small bore and stroke. Now, the best of engines soon develops some loss of compression. In a big cylinder that is of no moment, but in a small cylinder—such as one finds in the four-cylinder motor cycle—a loss that would be negligible in a 3½ h.p. single is vital to the smooth running of the "four." Such a small volume of gas is swept into the tiny cylinder of the four-cylinder that it must come in under the best possible conditions, *i.e.*, thoroughly well vaporised into a nicely warmed cylinder. Most riders of four-cylinders will agree that their mounts run best when well warmed up, and I think that water-cooling would be detrimental rather than beneficial to a "four" of small dimensions. How many discriminating drivers of the miniature four-cylinder light cars on the market disconnect their fans in the winter months, and it must be remembered that even the smallest light car engine would be unwieldy in a motor cycle frame. Moreover, a four-cylinder motor cycle engine must be more efficient than a light car engine, as it cannot be helped over a weak spot by the heavy flywheel, which car construction permits to be fitted.

H. E. THOMPSON.

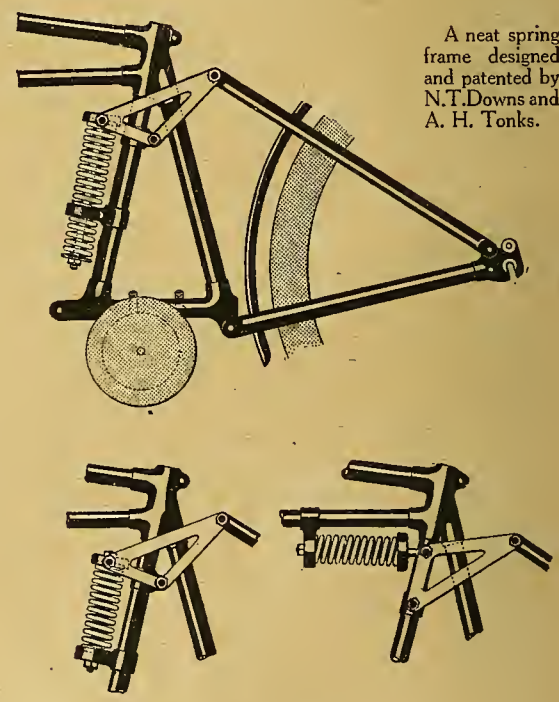
THE ALUMINIUM CYLINDER.

THE aluminium cylinder was under discussion in Coventry the other evening, when Mr. E. Carey Hill, M.Inst.M.E.T., delivered a splendid paper, "Aluminium and the Motor Industry," in which he dealt with the physical properties and some of the uses of the metal; also the characteristics of the leading alloys. Pure aluminium is never used in motor car or motor cycle construction, the alloys usually containing certain percentages of copper or zinc. Naturally the discussion after the paper turned to aluminium pistons, and Prof. F. C. Lea, D.Sc., the chairman, gave some very interesting information about pistons. Among other things, it seems that they "grow" slightly when first used, but luckily this is not continuous, and the magnitude of the growth is not sufficient to cause any serious troubles. However, the great interest in the discussion undoubtedly centred round the references to the aluminium cylinder, the possibilities of which were stated to be very great by more than one speaker whose position in the engineering world was sufficiently eminent to give weight to his words.

We need hardly tell our readers that the great advantage of aluminium as compared with cast iron is in the fact that its heat conductivity is between two and three times as great. This means that, other things being equal, an engine with an aluminium cylinder will still be delivering its power uncomplainingly when the cast iron cylinder would have become so overheated that the only possible remedy would be to stop to cool off. Obviously, too, there is some advantage in the weight, but this is not necessarily very great. It is enough to say that the advanced minds in the motor industry have a very great belief in the future possibilities of the aluminium cylinder, not merely to replace the cast iron air-cooled cylinder of the motor cycle, but to replace the water-cooled cylinder of the motor car engine. The fact that this should be seriously discussed shows at once how great is the effect of the higher heat conductivity of aluminium.

NEW IMPERIAL SPRING FRAME.

SPRING frame designs still continue to arrive constantly, the latest comer being a device patented by Messrs. Norman T. Downs (of New Imperial Cycles, Ltd.) and A. H. Tonks, of Birmingham (Patent No. 104,022). In general principle this resembles others that we have previously illustrated and described, and the present construction is probably as neat as it is possible to make it. The rear part of the frame is strengthened by having two tubes carried down from the saddle, one in front of the gear box and the other behind it. On the first of these are attached a pair of bell crank levers and the necessary spiral springs to take the shock and rebound. From the rear ends of the bell crank levers, stays extend to the axle and support the weight of the machine and rider. In the lower sketches the rebound springs are of smaller diameter, and are placed within the principal springs. The lower rear members are hinged behind the gear box. The design reviewed is further evidence that important manufacturers are giving attention to this important subject of springing.



A neat spring frame designed and patented by N.T.Downs and A. H. Tonks.

THE PETROL FAMINE.

NOTICE had been given that visitors could not proceed by rail to the course of the "War National," held at Gatwick, and the result of this prohibition was quite up to expectations. By the time the first race started the outside paddocks were crammed with cars, and by noon the ground in the immediate vicinity of the stand was so crowded that the later arrivals had to be parked down the road leading to the course.

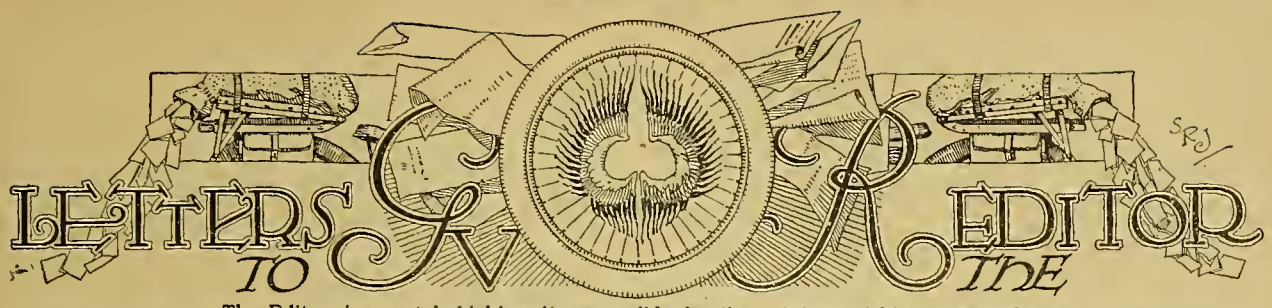
The Times estimates that the consumption of petrol on this race meeting amounted to 2,500 gallons. Most of the cars, states our contemporary, were of 15-20 h.p., and even up to 60 h.p. Most travelled something like sixty miles, and a fair proportion of the private cars carried only one or two, though other hired vehicles were crowded.

SECOND-HAND PRICES.

LAST week we published the impressions of certain of the leading agents on the subject of the prices of second-hand motor cycle, and further gave it as our view that the high water mark had been passed. Some further views are appended:

Firm E considered the market had been adversely affected.

Firm F thought the restrictions would have some effect, but were not uneasy, as their customers for months past had been men on National work who were prepared to pay good prices.



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

STORING HEAVY FUELS.

Sir,—With reference to a letter which appeared in March 21st issue of *The Light Car* and several other motor papers on the question of a petrol substitute which stood in a barrel for some time, and which would not burn until it was shaken up, etc., this clearly shows that the type of spirit put on the market is simply a mixture of a small quantity of good spirit, banked up with a lot of heavy spirit and "tailings." The very separation—to which the correspondent draws attention—proves this fact.

ARCHIBALD VICKERS, LTD.
A. VICKERS, Governing Director.

A STRONG STARTING MIXTURE.

Sir,—In your issue of March 22nd I saw an idea for easy starting, put forward by "M.M.K.," but surely the idea as illustrated would not work, for if the lubrication cap were opened the petrol would run out and empty the sump.

Many people seem to be under the erroneous impression that the level in an Amac carburetter comes only to the top of the main jet, whereas, in reality, the correct level is close to the top of the spraying holes, the main jet merely acting as a governing orifice to control the supply of fuel to the engine.

I also notice in the same issue of *The Motor Cycle* that a carburetter embodying a similar fitment has been patented.

Edgbaston. G.K.

ENGINE NAMES.

Sir,—I notice in your "Questions and Replies" (March 22nd, page 268) a query as to what the letters V.T.S. stand for, and I should be glad if you will give me an opportunity of replying to that query, so as to remove wrong impressions in some people's minds.

The V.T.S. Manufacturing Co. was established in 1914, and named its engine the Vitesse, which, as everyone knows, means speed. The company decided to use the letters V.T.S., because, spoken quickly, it sounds like the word fully spelt Vitesse. At that time, the same as now, we were supplying motor cycles fitted with engines made by the Villiers Engineering Co., Ltd., and V.T.S. might easily be confused with the Villiers two-stroke or the Veloce two-stroke.

To remove any impression on that score, we ask you to publish this letter. The engine will be known in future as the Vitesse engine, made by the Valveless Two-stroke Engine Co., Ltd., 303, Broad Street, Birmingham, of whom the "Sun" Cycle and Fittings Co., Ltd., Aston Brook Street, Birmingham, are the sole concessionnaires at the present time.

We are glad that your correspondent has given us an opportunity of explaining this, and I hope other users and intending buyers of motor cycles will see this very clear explanation.

THE "SUN" CYCLE AND FITTINGS CO., LTD.
WILLIAM PARKES, Director.

REAR SPRINGING OF MOTOR CYCLES.

Sir,—I should like to say a few words in reply to Mr. J. Martin's letter in your issue of the 22nd inst. I have been riding a 1913 Scott to and from business daily during the winter, and cannot agree that the 1½in. of movement provided by the spring forks is sufficient. They are very comfortable so long as the road surface is fairly good, but a level crossing always sends them up to their limit with a clash, while the shock of traversing a 4in. pot-hole at 15 m.p.h. or over is as though someone had dealt the base of the steering head a sharp blow with a sledge hammer.

I do not think the analogy drawn by your correspondent between the difference in the amount of movement provided between board hard and soft tyres holds good when applied to spring frames. Firstly, because the road vibration felt with a hard tyre is largely due to the rebound from an obstacle causing the wheel to jump into the air, owing to the air pressure in the tyre being too great to allow the cover itself to be deflected and absorb the shock.

Secondly, that the deflection of a spring (except volute types) is directly proportional to the load applied, but this is not by any means the case with tyres, with which the deflection does not increase at nearly so great a rate as the load. Which is why a much greater movement is required to give the same comfort and absorb the same shocks in the case of a spring frame than with a pneumatic tyre.

In conclusion, I should like to state that a spring frame on good roads is unnecessary weight and complication; therefore let us have a spring frame that will traverse rough and pot-holey roads without any clashing and in a manner that will justify its extra weight, cost, and upkeep

Shepherd's Bush. G.H.

CAVEAT EMPTOR.

Sir,—This phrase is nearly obsolete in practice and should be illegal in this country, although the buyer you mentioned did not seem to take ordinary precautions.

England departed from it thirty or forty years ago with the Merchandise Marks Act, the Food and Drugs Act, and the Weights and Measures Act, where the *seller* has to beware.

"A square deal" is the chief point in all successful modern trading, and when we get, as we will, an Act to compel every "sale" of anything over a £10 note to be entered on a taxed form, which must also contain the chief details, we will see the end of *caveat emptor*, which is a relic of the days of cattle fairs and such prehistoric meetings of rogues and horse-copers.

I suggest a form of simple model contract note. For example:

J.B. sells Cycle to C.D. 28/3/17.

Triumph	4 h.p., No. 7,164.
1914	Three-speed.
Bought	Ex Wrexham Mart.
Guaranteed	Working order.
Tyres	2 really good, 1 worn.
Price	£35.
Needs	Overhaul.

Disappointed buyers do not help to develop a trade.

J. D. MACK-IVOR.

WHEN MOTOR CYCLISTS DISAGREE!

Sir,—On reading my copy of *The Motor Cycle* of March 1st I was struck by an account which you published under "Military Notes" describing a chat with Capt. Francis, A.S.C. (M.T.). "Capt. Francis confirmed what had been stated in these columns on a previous occasion—that during the present winter months the lightweight was the more popular mount on account of its stability, and also of its ease of starting, simply by paddling along the ground with the feet, but when the warmer weather and hard roads arrived the heavyweight machine again came to the front." Well, in my opinion, and of all D.R.'s I have met, it is *quite the reverse*, as, after the break up of the severe frost,

the lightweight twin was of practically no use for a time, while the *powerful* single and twin showed up to advantage. Speaking of solo work up the line, practically the only machines are the 2¾ h.p. Douglas two-speed, lowest gear 8½ to 1, and 4 h.p. Triumph three-speed, low gear 13 to 1, and in addition handle-bar-controlled clutch (without which no machine should be sent out here). While the 4 h.p. Triumphs were on the roads almost every day, the roads were far too bad for the lightweight, which, in the case of myself and several others, stayed at home, and we either walked or got a horse. I should be only too pleased to get a heavyweight; at any rate we want *power*. In conclusion, I look forward every week to *The Motor Cycle*, which I have taken regularly since September, 1908, and wish to thank you for the interest you are taking in licence concessions for us motor cyclists, who are looking forward to a short leave, and, if possible, a few spins over decent roads. I am always pleased to read of fittings and conversions to machines made by amateurs, also illustrated tours in preference to the hackneyed type of photograph showing about six to ten men posing on a motor cycle. D.R.

B.E.F., France.

BRITISH MAGNETOS.

Sir,—The various British magneto concerns are going on the right way to build up a new industry for us. I required a small repair to my E.I.C. contact breaker, and within a few hours of writing to the E.I.C. Co. I received a new one, with a note asking me to return the original one. Promptness, courtesy, and efficiency; that is the business.

REG. W. L. MOTTRAM.

STROKE-BORE RATIO.

Sir,—The very interesting article in *The Motor Cycle* of March 22nd anent stroke-bore ratios as applied to motor cycles and cars recalls some interesting discussions. Broadly speaking, I think it may be assumed that the ratio is immaterial, but that "cubicity" is what counts. Thus if you have an engine of 1,000 c.c., it does not very much matter within wide limits whether it is of the square, big bore, or long stroke variety. Where excessive strokes have been used these have generally arisen from some outside influence, such as bore being the basis of taxation or the governing factor in the limit of engine size for some important race. I believe the longest stroke-bore ratio ever used on a genuine touring car was on the four-cylinder 12 h.p. Sizaire-Naudin car of about 1910-11, namely, 70 mm. bore × 170 mm. stroke. It was a highly-efficient engine, but not very pleasant to drive. It had very beautifully made tubular connecting rods—a feature I have often wondered has not been more extensively adopted in these days of ultra-light reciprocating parts.

The author of the article expresses some speculation as to whether the long stroke single-cylinder engine would have survived had single-cylinder engines themselves continued in favour on cars. Probably not; in fact, the single-cylinder long stroke engine probably killed this type of engine. About 1908 the French constructors actually produced single-cylinder racing engines of 100 mm. × 300 mm. bore and stroke. De Dion did this, and Sizaire came a good second, while Peugeot also contributed specimens. These were very sluggish to start, it generally being necessary to push the car with top gear engaged to start the engine. Immense speed and power were obtainable from these freaks, but the manufacturers soon saw that small "fours" would do equally well and could be driven by anyone. Thus the long stroke "singles" died. In multi cylinder engines the case is rather different, as, owing to the more even torque, a long stroke-bore ratio can be used without disadvantages.

Probably the almost square 500 c.c. motor cycle engine, which has proved so magnificently successful, is the greatest testimonial to the advantage of this type. Long stroke motor cycle engines have never been really successful—*pace* the Norton, which is not correctly a long stroke motor; it is a moderate stroke judged by long stroke standards.

Personally, I hope, and think, that the single-cylinder engine on motor cycles will not long survive, and that it will follow the same fate which has overtaken this type in the car world. When multi-cylinders—dare I suggest fours?—are the vogue on motor cycles, this discussion, I venture to think, will then become acute, and be waged with immense *verve* by two contending parties. M.S.

WATER-COOLING OF MOTOR CYCLE ENGINES.

Sir,—To claim the advantage of long periods of running without valve breakages, loss of power, and overheating, is inconsistent, for the exhaust valves of even a water-cooled engine get incandescent, and it is possible to burn them out in a short time when running with a weak mixture. In fact the exhaust valve is the weak point of all engines. Modern air-cooled engines have all the advantages of the old air-cooled engines, also the advantages of the water-cooled engines, with additional advantages of their own, and will leave the water-cooled engine far behind, and I will venture to say that the water-cooled engine will cease to exist on motor cycles, motor cars, and aeroplanes in the future.

No one condemns the racehorse because it requires more delicate treatment than the drayhorse. Yet both the racehorse and the air-cooled engine amply repay the effort.

I will also venture to say that, even if the Huns' favourite motor is water-cooled, we have very little to learn from them, whilst all nations have had a good lesson from the Spaniard.

The three Zeppelins were brought down by planes with air-cooled engines.

It is just the little rests that make the air-cooled engine possible and desirable for motor cycles.

Most motor cycles are not made to tear all out around Brooklands, but for use on the road; however, the modern air-cooled engine would tear all out around Brooklands as long or longer than the water-cooled.

Water-cooling is a most needless complication and weight for a motor cycle or aeroplane, and who has not seen water-cooled engines made by firms with world-wide reputations weep from almost every joint?

Whilst an aeroplane has been known to come down with a single bullet through the water system, with a dead loss to the superperfect (?) Huns, you may knock a lot of cooling ribs off an air-cooled engine without affecting its abilities to get home.

When the modern air-cooled engine is placed in the hands of motor cyclists, they will, as usual, try to knock the last ounce out of it.

In my opinion it is now time to reconsider the matter and sacrifice some of that efficiency for the use of a cheaper fuel—say 100 miles on a 6 b.h.p. engine for 3d.; it is quite possible, and the fuel all British. ENGINEER.

S. Farnborough, Hants.

Sir,—I was very interested in the article of "Ailette" in your issue of March 15th. He is perfectly right about the efficiency of the water-cooled aero engine. The only unfortunate "bugbear" of the water-cooled aero engine is the weight and bulk of water that is necessary to be carried for a long flight. The air-cooled engine has certain advantages of manufacture and lightness of weight, but it certainly will not stand up to very long flights for continuous periods with the same mechanical efficiency as its water-cooled brother.

Certainly the water-cooled engine needs a little more attention in the motor cycling world.

Please do not think that I am ignoring the capabilities of a well-designed and manufactured air-cooled machine. But, taking all the *pros* and *cons* into consideration, mechanically the water-cooled engine should be more efficient.

There are, I know, certain difficulties in the manufacture of a four-cylinder *monobloc* water-cooled motor cycle engine, but surely the British manufacturer will tackle the question seriously on the lines of a water-cooled flat twin. I know that a firm did design and was successful with a machine of this pattern, but why stop there? With a flat twin there would be more space for disposal, besides which the centre of gravity is lower. This would allow for the additional weight of water and the extra weight of the motor's water jacket. The radiator is really the apparatus that needs more thought, because it will have to combine lightness with cooling efficiency. It should be all cooling surface.

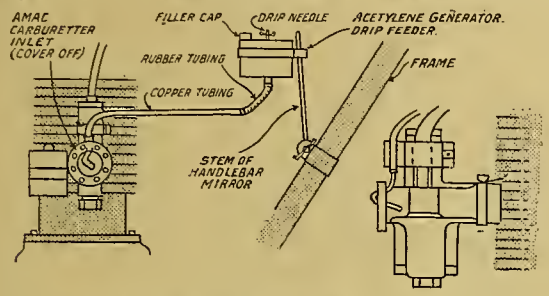
Thermal efficiency, as well as balance, is a thing to be taken into consideration, and it is not always the machine that finds favour with the manufacturer by being simple in design that is going to prove the best.

W. F. MAITLAND EDWARDS, R.E.

B.E.F., France.

AN EASY STARTING DEVICE.

Sir,—Enclosed please find sketch of easy starter, which I find very effective. It consists of the drip feed part of a small generator, fixed to a stem of a handle-bar mirror, and clamped to the frame with a bolt. I purchased 1ft. of ¼in. copper tubing and 3in. of $\frac{3}{16}$in. The $\frac{3}{16}$in. tubing being a little too small for fitting in the end of the ¼in.,



Easy starting device submitted by H. Yarrow.

I made a neat job of soldering it, afterwards bending the $\frac{3}{16}$in. to run a little way in the inlet pipe. On the bend from the drip regulator to join the ¼in. piping I placed a piece of rubber tubing, not having enough copper to complete the job; and last of all, to hold it firm to the mixing chamber of the carburetter, I ran a piece of sheet metal round it, and finished with a bolt. H. YARROW.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—In reply to your correspondent "L.H.T., there is certainly no reason why a man deprived of *one* eye or *one* limb should not be allowed a driving licence, if he is otherwise qualified to drive, *i.e.*, is careful, has plenty of nerve, and ordinary intelligence. With regard to the test for the latter qualification, the mistake is made of not allowing local councils to grant the driving licences, it being necessary to apply to an authority perhaps fifty miles away, who is quite ignorant of the qualifications of the applicant. If licences were granted by a local authority the applicant would be known to the members of the committee, and any disqualification he possessed could be noted. Of course, under any system some mistakes would occur, but if there were some investigation made it would be vastly better than allowing *anyone* a licence, even if epileptic or mentally deficient.

M. HITCHCOCK.

Sir,—When I wrote pointing out that one-eyed persons should not be allowed to drive motor vehicles I had no idea that the well-known fact that such persons are unable to judge distances would be denied. It is surprising that a man holding His Majesty's commission should be ignorant of such an elementary fact.

Lt. Hellier states that this is my "own theory," and that there is "no proof." He is wrong in both statements.

Prof. Halliburton, F.R.S., in Kirke's "Handbook of Physiology," writes as follows: "Since the *form* of the images perceived by the retina depends wholly on the *outline* of the part of the retina affected, the sensation alone is adequate to the distinction of *superficial forms* from each other, as of a square from a circle. But the idea of a solid body like a sphere or a cube can only be attained by the action of the mind constructing it from the different images seen in different positions of the eye with regard to the object, and, as illustrated in the stereoscope, from two different perspective projections of the body being presented simultaneously to the mind by the *two* eyes." (The italics are mine.) In other words, while one eye sees a flat image on a vertical plane, two eyes are necessary to perceive that objects have thickness and are spaced from one another along the line of sight.

A one-eyed driver, however, especially if he had had at some time the use of both eyes, would be able to form rough judgments of distance by the apparent size of objects with which he was familiar. For example, he would be able to judge his distance from cross-roads by the apparent size of a lamp post or pillar letter box at the corner. He would not be able to judge his distance from a motor car or human being in this way, since cars and human beings vary greatly in size. Accidents probably occur due solely to the fact that the one-eyed driver of a motor vehicle misjudged a distance because the object whose apparent size was the basis of his estimation was larger or smaller than was anticipated

Lt. Hellier's reference to a practice in sketching is in my favour. A sketch is a flat, not a stereoscopic representation, *i.e.*, it is a reproduction of a view as seen by one eye. Hence, in sketching, it is helpful to close one eye, not as Lt. Hellier states, for the purpose of "judging distance"(!) but to judge relative size in the vertical plane.

With regard to the one relevant fact contributed by "C.Q.M.S.," of course a one-eyed man can use a range finder, or almost any other optical instrument, at least as well as a man with two eyes. It is noteworthy that in the use of range-finders the object is observed from *two* points a known distance apart; a range-finder with only one telescope or "eye" would be useless.

Mr. Bonython is correct in saying that across a chasm or over water it is difficult even for a two-eyed man to judge distances. This is because the *nearest* object is so remote that the distance between the eyes of the observer is negligible in comparison, and he becomes in effect a one-eyed man. For example, a cube may be at such a distance that one eye is not at a sufficient distance to one side to perceive the back edge, which appears to coincide with the front edge. In fact, he sees a square merely just as a one-eyed man would. A. L. GRAY.

Sir,—I have been interested lately in the correspondence in your paper, and would like to give my experiences.

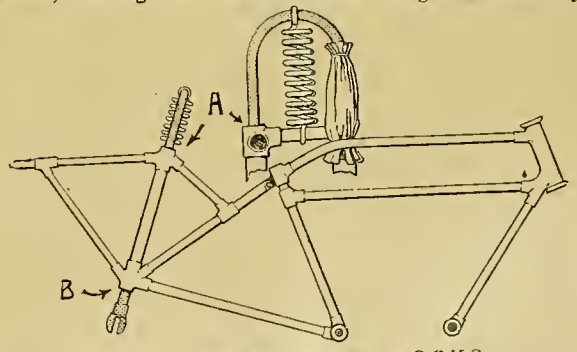
I am totally deaf in one ear and the other is also affected, but when on my motor cycle there is not a car or a cycle, lorry or anything else that I cannot hear, within reasonable distance of course. Also when I am in a tram I can if I like hear the conversation of any passengers at the other end. I could never hear it if it was not for the fact that I was in the car. The reason is if I am in a place where there is a continual noise going on—the engine firing in the first place and the noise of the car in the second—I can hear, but when all is quiet I cannot hear so well.

Many people who are deaf can see extra well, and also people who cannot see often have acute hearing powers. Also there are advertised in various papers electric appliances to make deaf people hear—well, some (not all) are merely minute electric buzzers, so you see that the noise of the motor cycle really helps rather than the opposite.

Regarding our wounded and maimed heroes, let them have a chance—they did their bit. If they find they cannot drive satisfactorily they will give it up themselves without being forced, but I am sure that after the war there will be many appliances on the market to help the maimed motor cyclist. P. O. BRADSHAW.

SPRING FRAME DESIGN.

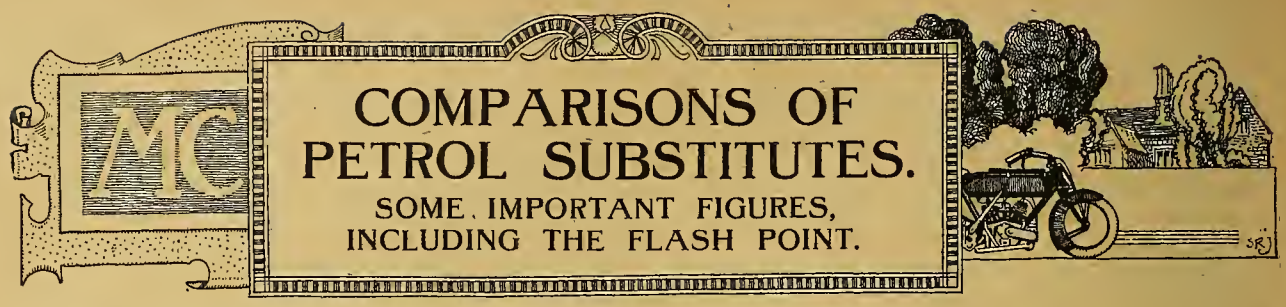
Sir,—I enclose a rough sketch of a spring frame which may be of interest. The design consists of an inverted "U" member sliding in two tubes forming part of the carrier, the angle of these two tubes being determined by



A form of spring frame suggested by P.C.K.S.

the centre of drive, whether direct or from the countershaft. The travel of the "U" member is controlled by a strong spiral spring, the friction of the long guides providing the necessary damping action. At the points marked A and B in the sketch tubes of oiled silk might be provided to prevent ingress of water and grit, and would be easy to make and replace when worn. The design may be old, but I do not remember seeing it. P.C.K.S.

London, N.W.



COMPARISONS OF PETROL SUBSTITUTES.

SOME IMPORTANT FIGURES, INCLUDING THE FLASH POINT.

THOUGH it is interesting to compare the flash-points and densities of the various heavy fuels that may be used as petrol substitutes, these figures are apt to be extremely misleading, for it is by no means possible to decide whether or not a heavy fuel is suitable as a substitute merely from its flash-point and specific gravity. Everything depends upon the constituents of the fuel, and very often one having a low specific gravity and a high flashpoint will give better results in a petrol engine than a fuel which, on paper, would appear better suited.

Let us refer, for instance, to the table giving the specific gravities and flashpoints of the various paraffins. It will be seen that white Rumanian oil has a lower flashpoint than Broxburn light combustion paraffin (shale), and therefore better results might be expected from the Rumanian oil than from the paraffin. As a point of fact, however, the shale paraffin yields very much better results than most of the petroleums, though on paper it would appear inferior to the majority of them.

Substitutes or Ordinary Paraffin?

There is not much to choose between the various lamp oils, and, generally speaking, those having a low flashpoint and a low specific gravity are to be preferred. Ordinary common lamp oil—that is, the cheapest that can be bought—is superior as a petrol substitute to the best and most costly brands, though it is as well to bear in mind the cheaper the oil the more likely is it to contain impurities in the way of water and dirt. It should, therefore, be strained through muslin or chamois leather in addition to the ordinary petrol filter, for though this is a lengthy business it is calculated to save trouble on the road.

Paraffin produced from shale, as distinct from petroleum or lamp oil, is among the best of petrol substitutes, though its offensive and clinging smell is a feature against its popular use. Phœbus is probably the best of petroleums for high compression internal combustion engines, this being a fuel which has been extensively used in official tests of various paraffin carburetters.

Paraffins.

Fuel.	S.G.	Flashpoint.
White May Lamp Oil	.792	106° F.
Common Lamp Oil	.790	80° F.
Royal Standard	.809	78° F.
Russian Vaporising Oil (used extensively for oil engines)	.823	88° F.
Phœbus (good, used extensively for paraffin carb.)	.803	73° F.
White Rumanian Oil	.787	80° F.
Broxburn Light Combustion Paraffin (shale, good)	.771	90° F.
Mexican Paraffin (poor)	.785	86° F.

Petrol Substitutes.

Fuel.	S.G.	Flash-point.	Initial Boiling.	Final Boiling.
Average Petrol	.745	—	71° C.	—
Petrofin	.780	78° F.	—	—
Arbeco	.880	75° F.	—	—
Petrolior	.773	77° F.	—	—
Major Motor Spirit	.800	73° F.	—	—
Thewal Motor Fuel	.800	76° F.	—	—
Binks	.772	80° F.	—	—
M.M. Fuel	.810	74° F.	—	—
M.A.R. Motor Spirit	.777	83° F.	140° C.	196° C.
Fred. G. Scott and Co.	.773	84° F.	149° C.	198° C.
J.H. Petrol Substitute	.77	83° F.	—	—
Teprol	.785	83° F.	—	—

Substitutes.

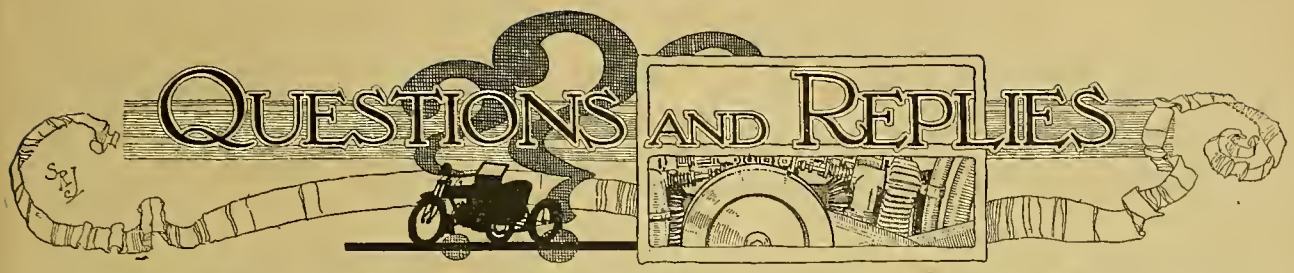
Turning now to the various substitutes, it will be observed that, with one exception only, namely, Arbeco, all are much of the same density, and also that, so far as specific gravity and flashpoint are concerned, there is but little to choose between the substitutes and the various brands of lamp oil. Some of these substitutes, however, are quite free from paraffin, being by-products of coal gas, and the majority are distilled in a manner which renders them more suitable as petrol substitutes than ordinary lamp oil. The desirable properties of a really good lamp oil, indeed, may be quite undesirable in an engine fuel, and therefore it is perhaps the best plan to adopt a good substitute and stick to it rather than experiment with different grades of lamp oil.

In using substitutes, it is by far the best plan to buy in bulk. The carburetter can then be adjusted to suit the one sample, whereas if different fuels be used haphazard good results cannot be expected.

A heavy fuel should not be left standing undisturbed in its cask for any length of time, as the heavier oils it contains are apt to sink to the bottom of the cask. Consequently, a very heavy liquid is drawn off when next the tap is opened, the lighter spirit remaining in the cask till the last. This can be avoided by shaking the cask each time fuel is drawn off.

Care of Wooden Casks.

Wooden casks are inferior to steel drums, as fuels of a paraffin nature will slowly percolate through the best of casks. The cask should stand in a cool and shady place during the summer months, otherwise the ribs will dry and the fuel evaporate. It is as well to cover the cask with sacks, which can be soaked with water each morning, thus keeping the fuel cool and the cask in good condition.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Charging Accumulators.

I should be much obliged if you would give me your advice on the following: How many 32 c.p. lamps would be necessary to reduce a 250 volt current, so as to charge a 6 volt accumulator?—V.I.R.C.

Two or three lamps will be sufficient, depending upon the size of the accumulators. It does no harm to charge an accumulator more slowly than the normal rate, but simply takes a longer time. It is not a question of reducing the voltage, but of the amount of current passed. Be sure to ascertain that the current is direct, and leave the switch open when charging, thus forcing the current through the accumulator.

Dismantling.

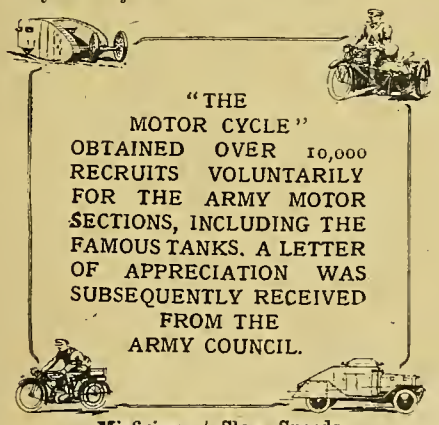
I have been riding a Calthorpe two-stroke (Peco engine) for the past ten months, mostly on town work, and am glad of the hint in *The Motor Cycle* to the effect that two-strokes on town work require very little oil in winter. On cutting down the supply of oil (by drip feed) recently I found the engine two-stroking more regularly, so I must have been over-oiling previously. The compression is rather poor now. I have come to the conclusion that the top piston ring is probably carbonised up, and I wish to remove the cylinder, if possible, without disturbing the flywheel. The holding down nuts seem inaccessible with an ordinary spanner, and I should be glad if you can inform me (1) whether the cylinder head of the Peco two-stroke can be removed without disturbing the flywheel, and, if so, what kind of spanner is necessary? (2.) How is the two-speed Albion lightweight gear box dismantled? Is the chain driving wheel keyed on a taper spindle, or is it simply screwed on? Have the chain wheel and pulley to be taken off before the cover at the other end of the box can be removed?—C.G.J.

(1.) There is no need to disturb the flywheel in order to remove the cylinder. The nuts can be slackened off with a small B.S.A. spanner with a little manœuvring. Take great care, when removing the cylinder, not to damage the thick packing joint between the cylinder and the crank case. This joint sets very hard, and is easily broken in lifting the cylinder. (2.) The Albion gear box can be dismantled simply by removing the end plate to which you allude. The chain driving sprocket is keyed on the tapered shaft, and can be removed, if no sprocket remover be available, by slackening the lock nut, jamming something behind the sprocket, then tapping the end of the shaft (with the nut still on) with a mallet. No, the chain wheel and pulley need not be taken off before the end plate is removed.

Sidecars on Lightweights.

Having just purchased a 2¼ h.p. two-stroke Triumph motor cycle, I am writing to ask you if this machine is capable of taking a small sidecar. I should very much like to fit one if possible, or do you think the horse-power too small?—W.H.

You would be unwise to attach any form of sidecar to a 2¼ h.p. Triumph, as the machine is not intended for such severe strains, and the frame and wheel alignment would suffer as a consequence. Probably if you ask the makers of the machine their opinion they would disclaim all responsibility for the machine if you subjected it to such uses.


"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

Misfiring at Slow Speeds.

I have lately been troubled by misfiring in one cylinder of my small V twin at slow speeds. The ignition and carburetter are all right. What other reasons could you give?—B.S.

The misfiring in one cylinder at slow speeds is probably due to an air leak at the induction pipe joint. It might also be due to a faulty plug, incorrect tappet adjustment of the cylinder affected, or weak valve springs. Finally, you should make quite sure that the carbon pencils of the magneto are in good condition and free from oil. After long running these pencils become glazed, and it is as well to roughen them from time to time. This is readily done by rubbing them on a fine jewellers' file, or even the cylinder casting will suffice, if no file happens to be at hand.

Altering a Magneto.

I have a 50° magneto which runs clockwise. Can I make it anti-clockwise by changing the contact breaker? If so, will it be just as efficient as at present?—J C.W.

You may run a magneto in a counter-clockwise direction if you fit a suitable contact breaker, and it will be just as efficient as it is at the present time.

Running on Paraffin.

I have a late 1914 3½ h.p. Humber. As there is only to be a limited supply of petrol (in all I have twelve gallons), I would like to try paraffin. I have closely studied all the hints given in your paper for months, and I propose a jacket for the induction pipe heated from the exhaust, and a piece of sheet copper round the float chamber radiating heat from the cylinder. I would like advice on the following points: (1) Would copper do for the pipe from the exhaust to the jacket, or would it require to be cast iron? (2.) Would I require to have an outlet pipe from the jacket, or a return to the exhaust in some way? (3.) Is it necessary if these are fitted to heat the air inlet? I have a B. and B. carburetter. There seems to be great differences of opinion in contributions to your paper on this interesting point.—BEGINNER.

(1.) Copper pipe would be better in this case, as it is a better conductor of heat. (2.) Yes, you would have to have an outlet pipe from the jacket. This might be directed on to the ground or to any convenient spot. It is better not to bring it back to the exhaust pipe. (3.) Under these circumstances a hot air inlet would not, we think, be necessary. What is meant is that it is desirable to take the air in hot, otherwise the vaporisation is poor. It would be worth experimenting to see if any further improvement could be obtained by taking in the air warm as well as heating the induction pipe, but, as we have said before, we hardly think this would be necessary. We presume you are aware that petrol substitutes purchased for running a motor cycle have now to be entered on the petrol card.

Refusal to Run on High Gear.

I have a 2¼ h.p. two-stroke, 1915 model, petroil lubrication, Albion two-speed gear box, 5 to 1 and 9¼ to 1, Senspray carburetter, and U.H. magneto. On low gear it picks up immediately after about two steps and jumps on. I can then open the throttle half way and air half way, and throttle down for slow running or open out for speed. But the engine stops immediately I transfer over to high gear. I throttle down, raise exhaust and change over; it stops with a sudden jerk. I have tried running with the machine, but cannot make it fire, but immediately I engage the low gear I can start without trouble. Can the fault be in the gear box? I have timed the magneto points just breaking a shade under dead compression stroke. The makers say $\frac{3}{16}$in. with the ignition retarded, but I have the above result, still not affecting the high gear. I am using petrol one gallon, Price's summer grade oil half pint. Senspray fitted, 28 jet. Would it on this mixture run a 30 or 32 jet? Is there any harm using the low gear till the fault is located, riding, say, ten or fifteen miles per hour?—P.S.

Firstly, make sure that the rocker arm in the magneto is working freely. It looks rather as though this is sticking at low speeds. If you find it is at all inclined to stick, remove the rocker arm and enlarge the fibre bush slightly by means of a strip of thin emery cloth wrapped round a match. Do not overdo it. Very little rubbing would be sufficient to free the arm. We do not think your trouble can lie in the gear box, but cannot say for certain without trying the machine. If the fault is in the gear box the machine would stop dead, skidding the back wheel, but if it is merely the engine which ceases to fire the wheel would be stopped by compression and not so suddenly. We think that the most probable cause of your trouble is in the magneto timing. The timing is too far advanced, with the result that the engine back-fires unless revolving at high speed. With very fast timing it would be quite easy to start on low gear, but you would not be able to start on high because the engine would back-fire. Readjust your timing as follows: Place control lever fully retarded, piston dead on top, magneto points just breaking. This will give dead centre firing with magneto fully retarded, and the advance should be sufficient for ordinary riding. We would not advise you to interfere with the carburetter. A 28 jet should give good results, and by using a larger jet your petrol consumption will increase, and you will probably get four-stroking. You will certainly do your machine no good by running on low gear for any length of time. Do not use the decompressor for changing into low, but allow engine to gain speed with gear momentarily in neutral.

Lack of Power.

I should be very much obliged if you would give me a little advice with regard to my two-stroke. It will not climb hills or exceed about 15 m.p.h. on the flat without back-firing through the carburetter and violent explosions in the silencer. I give herewith a few facts that may be of assistance to you. Plug: Lodge two-stroke; have tried others, but they have no effect on the misfiring. Magneto: Dixie, fixed ignition, timed well in advance; platinum points separate ½ mm. Carburetter: Amac, jet No. 29. Have tried larger and smaller, but with no improvement. Engine has recently been cleaned. I am using pure petrol, but find starting most difficult. I have always to remove and clean plug at least once before I can get a start, as the points become covered with liquid petrol.—J.S.T.

The symptoms you describe point rather to one of two things. (*a*) The petrol lever in the float chamber of your carburetter is set rather too low. (*b*) There is some obstruction which prevents the petrol from reaching the carburetter in an even flow. As regards (*b*), the obstruction may be due to air lock, owing to the pipe being wrongly bent, to a choked filter gauze, or to the vent in the petrol tank having become choked. We would advise you to go carefully over these points before interfering with the petrol level. To raise the level place a small brass or copper washer over the cross piece on the needle to weight it. Your plug points certainly should not become wet with petrol. This rather suggests that you are in the habit of flooding too liberally. Wheeling the machine in gear, the throttle slightly open, and the decompressor raised, would also cause an excessively rich mixture to gain the cylinder, as with a two-stroke, unlike a four-stroke, a full charge is drawn in whether or not the decompressor is lifted. If, therefore, you have to wheel your machine some little distance before mounting, you will be well advised to do so with the gear in neutral or the throttle closed. (See *The Motor Cycle*, March 22nd, page 249.)

RECOMMENDED ROUTES.

PETERSFIELD TO SHERBORNE.—P.J.F.
Petersfield, Winchester, Stockbridge, Salisbury, Coombe Bissett, Broad Chalk, Berwick St. John, Shaftesbury, Sherborne.

LIVERPOOL TO BRISTOL.—R.H.G.
Liverpool, Birkenhead, Chester, Handley, Whitchurch, Hodnet, Wellington, Bridgnorth, Kidderminster, Worcester, Tewkesbury, Gloucester, Alveston, Bristol.

EXETER TO LOUGHBOROUGH.—S.B.W.
Exeter, Honiton, Ilminster, Ilchester, Sparkford, Bruton, Frome, Beckington, Trowbridge, Melksham, Chippenham, Malmesbury, Cirencester, Burford, Chipping Norton, Banbury, Southam, Rugby, Lutterworth, Leicester, Loughborough. Approximately 200 miles.

In submitting to the Editor articles, photographs, or drawings, contributors are asked to mention whether the illustrations are exclusive, and further to enclose a stamped addressed envelope for return of unaccepted contributions.

TRING TO BIRMINGHAM.—T.T.
Tring, Aylesbury, Bicester, Aynho, Adderbury, Banbury, Gaydon, Warwick, Knowle, Solihull, Birmingham.

LIVERPOOL TO NEWCASTLE.—R.H.G.
Liverpool, Ormskirk, Preston, Whalley, Clitheroe, Gisburn, Skipton, Ripley, Ripon, Thirsk, Northallerton, Great Smeaton, Darlington, Durham, Newcastle.

HORWICH TO HALSTEAD.—T.D.
Horwich, Bolton, Manchester, Stockport, Macclesfield, Leak, Ashbourne, Derby, Loughborough, Leicester, Market Harborough, Kettering, Thrapstone, Huntingdon, Cambridge, Haverhill, Halstead.

CONGLETON TO CAMBRIDGE.—F.H.M.
Congleton, Leek, Ashbourne, Derby, Loughborough, Six Hills Inn, Melton Mowbray, Stamford, Wansford, Norman Cross, Alconbury Hill, turn left for Huntingdon, Fenstanton, Cambridge. Approximately 135 miles.

FAREHAM TO MANCHESTER.—H.A.
Fareham, Bishop's Waltham, Winchester, Andover, Ludgershall, Marlborough, Swindon, Cricklade, Cirencester, Cheltenham, Tewkesbury, Worcester, Kidderminster, Bridgnorth, Wellington, Whitchurch, Tarporley, Northwich, Altrincham, Manchester.

BIRMINGHAM TO EPSOM.—A.W.
Birmingham, Henley-in-Arden, Stratford-on-Avon, Shipston-on-Stour, Long Compton, Enstone, Woodstock, Oxford, Dorchester, Nettlebed, Henley-on-Thames, Maidenhead, Slough, Windsor, Staines, Hampton Court, Kingston, Ewell, Epsom.

MALMESBURY TO TIVERTON.—E.E.B.
Malmesbury, Chippenham, Melksham, Trowbridge, Southwick, Beckington, Frome, Shepton Mallet, along the Fosseway to an inn a mile and a half from Kineton Mandeville, thence skirting Somerton to Langport, Curry Rivel, Taunton, Wellington, Sampford Peverill, Tiverton.

STAINES TO ABERYSTWYTH.—B.C.
Staines, Windsor, Slough, Maidenhead, Henley, Nettlebed, Wallingford, Didcot, Wantage, Faringdon, Lechlade, Cirencester, Gloucester, Ross, Hereford, Willersey, Kington, New Radnor, Rhayader, Llangurig, Dyffryn Castell, Aberystwyth.

OXFORD TO WINCHESTER.
A correspondent tells us that the road from Oxford to Winchester is at present in a very bad state, and not fit for any motor cycle. The ruts in places are 12in. deep. He advises the following alternative route: Oxford, Nuneham Courtney, Dorchester, Wallingford, Streatly, Pangbourne (turn right for Bath Road, and again right on meeting it), Aldermaston, Basingstoke (road bad for a few miles, but not to be compared with some of the Newbury stretch), Winchester. The roads round Winchester are in general bad, owing to the military traffic.

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PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to _____ & Co. ILIFFE & SONS Ltd., and crossed _____

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S., 4h.p., solo, new Sept., 1916, fine condition; £65.—J. W. Fortnum, Middlewich. [9947

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [X7098

A.J.S. 1914½ 6h.p. Combination, 3-speed, hand clutch, hood, screen; £65.—29, St. Leonard's St., Bow. [1052

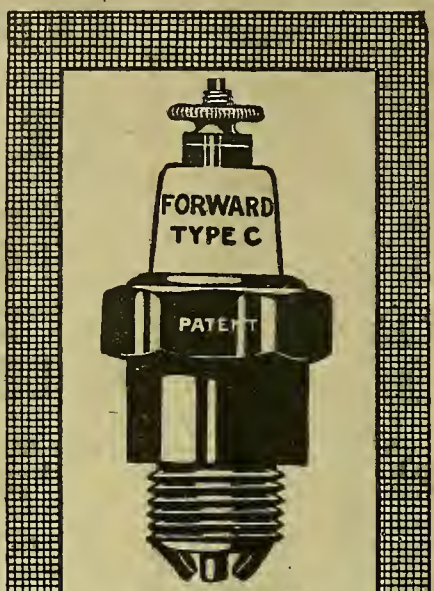
1913 A.J.S., 6h.p., 3-speed countershaft, clutch, kick starter, with Mills-Fulford sidecar, perfect order; £48.—Montgomery, Victoria Rooms, Bristol. [X8506

A.J.S. 1916 (October) Combination, spare wheel, horn, lamps, practically absolutely new, unsoiled; £100 lowest. Mrs. Davies, Albion House, Prestcigne. [9939

2¾h.p. A.J.S., 1913, semi T.T., 2-speed, hand clutch, 1916 Pilot B. and B., U.H., Hutchinsons, excellent condition, lamps, spares.—Dixon, 9, The Crescent, Surbiton. [9996

1913 A.J.S., 6h.p., 2-speed, clutch, and sporting type sidecar, in splendid order; any trial; £33.—Tuke and Bell, Ltd., Motor Dept., Carlton Engineering Works, Tottenham, N.17. [1023

A.J.S. Motor Cycles, 6h.p. combination, 2¾h.p. 3-speed models actually in stock; last opportunity to secure one of these famous machines. A.J.S. specialists.—Walsall Garage, Walsall. [X8224



FORWARD

Plugs do not "live on the reputation of the reputation they might have made"—the foundation of their great popularity is the reputation that has been established firmly and solely on merit. That merit appeals to all its users, as it will to you.
Ask your Agent for details of our many models.

FORWARD MOTOR CO., 35, Forward Works, Summer Row, Birmingham.

Before your fastener fails, you can stop it—you can't after! See about it now—fit the FORWARD—the fasteners that *never* fail. They're kind to belts, too!

VEVO THREE SPOUT INJECTOR

Polished and Plated.

No. 74.
Post Free, 3/3 Net.

For injecting Grease and Heavy Oil into Gear Cases, Hubs, etc. A most useful article for all speed merchants.
Thousands are being supplied to the Government.
Vevo Works, PARK LANE, BIRMINGHAM.

IMPORTANT NOTICE.

Owing to the Easter Holidays, the Issue of "The Motor Cycle" for April 12th must be closed for press earlier than usual. All copy and instructions for Miscellaneous Advertisements in that issue must, therefore, be in our hands not later than first post on Thursday, April 5th.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

1914 3-speed 6h.p. A.J.S. Combination, with No. 3 Jenbro metal sidecar, in splendid condition, engine just overhauled by A.J.S., complete with Lucas head, side, tail lamps, and horn; 65 gns., a bargain.—J. Fanocurt, Stamford, Lincs. [X8365

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

1916 Alldays Allon, 2-speed, clutch model, new condition; £36.—Ross, 86, High Rd., Lee. [1084

1914 3½h.p. 2-speed Alldays Matchless, footboards, etc.; £30.—Parker and Son, St. Ives, Hunts. [1116

ALLONS.—1917 2-speed models for immediate deliveries; £44/2.—Jones, Garage, Broadway, Muswell Hill. [9885

ALLON De Luxe, 1917, spring frame model, 2-speed, clutch, kick start, run 100 miles; cost £52, 42 gns.—Troward's, 78, High St., Hampstead. [1179

ALLDAYS Allons, all models in stock; deferred payments, exchanges.—Lamb's 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green. [9986

ALLON.—All 1917 models in stock, 36-45 gns.; exchanges and deferred payments arranged.—Maudes', 100 and 136 Gt. Portland St., London, W Tel.: 552 Mayfair. [7387

1915 Countershaft Alldays-Matchless 4h.p. Combination, smart outfit, and completely equipped; genuine bargain, 50 gns.; exchanges.—Newnham, 223, Hammersmith Rd., W.6. 'Phone: 80. [1024

Ariel.

ARIEL, 3½h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [9211

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

ARIEL, 1914, 3½h.p., free engine, in real good order; £18.—Percy and Co., 337, Euston Rd., London. [X8455

ARIEL, 1912, T.T., 3½h.p., clutch and variable gear; 16 gns.—Troward's, 78, High St., Hampstead. [1180

ARIEL, the reliable motor cycle, 3½h.p. single, and 5-6h.p. twin models; delivery from stock.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0889

ARIEL Combination, brand new condition, 3½h.p., 3-speed, clutch, B. and B., Bosch, lamps, horn, new tyres, beautiful coachbuilt sidecar, aluminium step.—Williams Garage, 18, Church Rd., Brixton, S.W. [9941

MOTOR CYCLES FOR SALE.

Ariel.

ARIELS,—1917 5-6h.p. combinations and 3½h.p. combinations for immediate deliveries; cash, deferred, or exchanges with up-to-date machines, Douglas preferred.—Jones, Garage, Broadway, Muswell Hill. [9886

Auto-Wheels

AUTO-WHEEL, B.S.A., 1916, mileage under 1,000; 8 gns.—Troward's, 78, High St., Hampstead. [1203

NEARLY New Genuine Wall Auto-Wheel, splendid condition and running order; £8 10.—Murray, 37a, Charles St., Hatton Garden, Holborn. [X8472

Arno.

1915½ Arno-Triumph, 3½h.p., almost new, and fully equipped; £25.—20, Whitley St., Reading. [1104

Bat.

1914 Bat, 4-5h.p., 2-speed, C.S., very fast; £35.—Ross, 86, High Rd., Lee. [1085

BAT 1913 6h.p. Twin, J.A.P. 3 speeds, in real good order and condition; £30.—Percy and Co., 337, Euston Rd., London. [X8464

BAT, 8h.p. T.T., just thoroughly overhauled, new bushes throughout, mag. remagnetised, new valves and valve levers, good tyres and enamel; trial run; owner in France.—Sgt. Strand, Hingham, Norfolk. [X8064

Bradbury.

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage; £49/10.—Motor Exchange, Horton St., Halifax. [9965

BRADBURY, 3½h.p., N.S.U. 2 speeds, in nice order, £16; another, £14.—Percy and Co., 337, Euston Rd., London. [X8460

BRADBURY, 4h.p., Watsonian sidecar, N.S.U. 2-speed, adjustable pulley; bargain, 19 gns.—12 Tosiin Rd., South Acton. [X8355

BRADBURY, 2¾h.p., waterproof mag., B. and B., good tyres, slight attention to engine; £5.—16 Carlyle Rd., Manor Park. [1043

1912 4h.p. Bradbury, N.S.U. 2-speed, 1916 Binks and cane sidecar, splendid puller; owner joining up; £20.—Pell, Butcher, Westgate-on-Sea. [9951

1914 4h.p. Bradbury, 3-speed, kick starter, coach-built sidecar, new tyres, fully equipped, good reliable machine; £40.—Dale, 26, Powis St., Woolwich. [9924

BRADBURY, 4h.p., and sporty sidecar, variable gear, splendid condition; £25; no reasonable offer refused; owner called up.—Broom, 77, Marylebone Lane W. [X8371

BRADBURY, 1911-12, has recently been overhauled new piston and rebushed, 2-speed, kick starter, coachbuilt sidecar, lamps; £25, or exchange for light weight solo.—Haywood, 95, Tufnell Park Rd., N. [X8367

BRADBURY, 3½h.p., late model, 2-speed, free engine, with 15 gn. coachbuilt sidecar, whole outfit splendid condition, small mileage; any trial; sacrifice £28; must sell.—29, Brigstock Rd., Thornton Heath. [1108

Brough.

3½h.p. Brough, H.C., late 1916, done under 600 miles, as new, Lucas horn and lights; bargain, £45; owner bought car.—Lt. Elmhirst, Howden, Yorks. [X8528

B.S.A.

B.S.A., 1917 models H and K, with sidecars, in stock —Moss, Wem. [X8497

1917 B.S.A.'s, all models in stock; £66 and £64.—Walsall Garage, Walsall. [X8231

HOLMORE Depot, 261, Deansgate, Manchester, for immediate delivery of B.S.A [0798

1917 B.S.A. Model K in stock, £64; sidecar to suit 15 gns.—Cross, Agent, Rotherham. [X8411

B.S.A. Motor Bicycle, chain-cum-belt, in stock.—H. C. Cecil, B.S.A. Agent, Swan Cycle Works, Ledbury. [X8223

GATE 1913 3½h.p. 2-speed B.S.A., Montgomery C.B. sidecar, guaranteed perfect; £32/10.—20, Whitley Rd., Reading. [1102

B.S.A.—1917 Model H and K in stock; cash or deferred payments. — Jones, Garage, Broadway, Muswell Hill. [9887

B.S.A., 4½h.p., 1914, chain drive, 3-speed, Cowey new tyres and sidecar; £40, bargain.—123, Pinstone St., Sheffield. [1151

3½h.p. B.S.A., 1915½, 3-speed, coachbuilt sidecar, speedometer, perfect condition; £55.—133, Archway Rd., Highgate, N. [1145

B.S.A., 1913-14, 2 speeds, and free engine, with Mill-ford sidecar, accessories; £39; trial.—Wells Butcher, Wanstead, Essex. [1006

B.S.A., 1916, 4½h.p., mag., 3 speeds, countershaft; 55 gns.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [1131

B.S.A., 1917 H and K Models in stock for immediate delivery; exchanges entertained.—Eagles and Co., High St., Acton, London. [X8477

B.S.A., 1917, 4½h.p., 3 speeds, etc., absolutely new condition, complete with lamps, horn, etc.; £57/10 Rowlatt, Silver St., Wellingborough. [X8445

GET IT AT Taylor's

FOR CASH or EXTENDED PAYMENTS.

LIGHT CARS.

1915 11 h.p. **LAGONDA** 4-seater, fully equipped £145 0

1915 Baby **PEUGEOT** £135 0

MOTOR CYCLES.

1915¾ 4 h.p. **A.J.S.**, fully equipped £72 0

1917 7-9 h.p. **HARLEY-DAVIDSON**, electric equipment £102 0

1917 7-9 h.p. **HARLEY-DAVIDSON**, magneto ignition £93 0

1917 **H.-D.** Sidecar £24 10

1916 4½ h.p. **B.S.A.**, Model K, nearly new £55 10

1917 2½ h.p. **EXCELSIOR-J.A.P.**, 2-speed £48 0

1917 2¾ h.p. **EXCELSIOR**, 2-stroke, 2-sp. £44 2

1917 4 h.p. **CALTHORPE-J.A.P.** Combination £73 10

1917 2¾ h.p. **CALTHORPE-J.A.P.** £39 18

1916 2½ h.p. **NEW IMPERIAL-J.A.P.**, 2-speed and kick-starter, nearly new.. £35 10

1915 Lady's **COMET**, 2-speed, nearly new £28 15

SIDECARS.

1917 6 h.p. **A.J.S.** Sidecar, hood, screen, etc., new £25 3

Canoelet Minor Lightweight, new, with apron £10 0

Ditto, Second-hand £7 15

1916 **CORONET** Coachbuilt, luggage board £8 15

CANOELET Coach, just re-painted £8 8

6 h.p. **A.J.S.**, body only, luggage grid, new £9 9

Cane very roomy Sidecar, hood and screen. Suit 6 h.p. machines £7 0

Wicker Sidecar £1 15

USEFUL ACCESSORIES.

Waterproof-back **Gauntlet Gloves**, double leather palms, lined, wrist straps. Keeps the hand warm and dry 12/6

Special Cape Grain-lined Gloves, wristlet straps 8/9

TAN SAD Spring Pillion Seats, as illustrated, Model 3 ..... 27/-

All Models stocked. Send for Special List.

Sole London Agents for A.J.S. and EXCELSIORS.

Spare Part Stockists of most makes.

H. TAYLOR & CO., Ltd.

Showrooms: 21a, STORE STREET, W.C.1.

Wholesale: 38, ALFRED PLACE, W.C.1.

Garage: 12, Tottenham Mews.

'Phone—Museum. 1240.

Telegrams—"Dynametro, Westcent, London."

MOTOR CYCLES FOR SALE.

B.S.A

1917 B.S.A. in stock. Catalogues free. Spare parts per return. Lin belts as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch Tel.: 91. [X0529

B.S.A. K in stock; liberal allowance on Douglas B.S.A., or Enfield in part exchange.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [9987

B.S.A. Motor Bicycles, chain and chain-cum-belt models in stock.—A. Watkins, The B.S.A. Agent, 150, Stoney Lane, and 565, Stratford Rd., Sparkhill, Birmingham. [X7440

1915 B.S.A., 4h.p., 3-speed countershaft, kick starter, chain-cum-belt drive, all accessories, condition as new, little used; £45.—Lieut. Digwood, Berks. Yeomanry, Ipswich. [X8311

B.S.A., 3½h.p., 2-speed, F.E., with cane sidecar, kept in perfect tune and condition by owner-mechanic; sell at sight; £30, lowest.—Rudham, 221, High Rd., Willesden Green. [X8400

B.S.A., 1915, 4½h.p., with head lamp, generator, speedometer, rear light and knee grips, in new condition; £55; extended payments arranged.—Service Co., 292, High Holborn, London. [X8421

B.S.A., 1914, 4½h.p., all-chain, countershaft 3-speed, B.S.A. 16 gn. model sidecar, luggage grid and apron, auxiliary tank, lamps and horn; £50.—E. Hobbs, Little Faringdon, Lechlade. [X8514

B.S.A., 1916, 4½h.p. Model H, all chain drive, and Phoenix sidecar, Lucas lamp, Stewart signal, very little used, and in excellent condition; £56.—Hucklebridge, 133, Sloane St., S.W.1. [X8407

B.S.A., latest new models in stock; chain-cum-belt Model K, £64; sidecars in stock to fit, from 10 gns. Your present machine can be taken as part payment.—Elce and Co., 15-16, Bishopsgate Av., Cannonile St., E.C. [0551

Calcott.

CALCOTT Motor Cycle, 2½h.p., thoroughly overhauled, tyres as new; £17, including lamps.—Bacon, Wellington, Salop. [X8483

Calthorpe

CALTHORPE 2½h.p. 2-stroke, brand new; £28/16. —248, Bishopsgate, London, E.C. [1127

COLMORE Depots, Birmingham, Manchester, and Liverpool, for Calthorpe motor cycles [0799

1916 Calthorpe-Jap, 2¾h.p., 2-speed, not ridden 500 miles; 30 gns.—E. Crisswell, Newmarket. [1050

2¾h.p. Calthorpe, 2-stroke, 2 speeds, etc., good condition; 23 gns.—Myrtle Cottage, Ormerod Rd., Burnley. [X8521

CALTHORPE, 1916, 2¾h.p., 2-speed gear, perfect throughout; cash offers.—Bungalow, Ascott-under-Wychwood, Oxon. [X8395

1916 Calthorpe-Precision, 2¾h.p., can hardly tell from new; £25.—Jones, Garage, Broadway, Muswell Hill, N.10. [1165

1917 Model 2¾h.p. Calthorpe-Jap, 2 speeds, etc., in new condition; cost £43, accept 33 gns.—30, Talbot St., Burnley. [X8519

1915 2¾h.p. Calthorpe-Jap, new August, 1916, 2-speed, T.T. bars, long exhaust, original tyres A1; £26.—114, Palace Gates Rd., Wood Green, N. [X8418

CALTHORPE Junior, 1914-15, 2½h.p., 2-speed, new tyres and belt; £15, or near offer.—16b, R.F.C. Flats, Lyndhurst Rd., South Farnborough, Hants. [9913

CALTHORPE, 1916, 2½h.p. J.A.P., Enfield 2 speeds, brand new, listed £42, accept £36; another, 1916, second-hand, almost new, £28.—Percy and Co., 337, Euston Rd., London. [X8461

CALTHORPE-J.A.P. Lightweight in stock, also 1915 2-stroke, 19 gns.; deferred terms, exchanges.—Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green. [9985

P. J. EVANS, Birmingham and District Agent.—Calthorpe 1917 models in stock; two-stroke and four-stroke lightweights, and 4-5h.p. twins, solo or as combination.—John Bright St. [X8438

Chater-Lea

CHATER, 2-stroke, 2-speed, overhauled; £18; extended payments arranged.—Service Co., 292, High Holborn. [X8432

CHATER-LEA, 2¾h.p. 1915 Villiers engine, 2-speed countershaft gear, T.T. handle-bars; £26/10.—Eagles and Co., High St., Acton, London. [X8478

1917 Chater-Lea 2-strokes in stock for immediate delivery, £41; 2-speed countershaft models.—Jones, Garage, Broadway, Muswell Hill, N.10. [1166

CHATER-LEA, 2¾h.p. 1915 Villiers, 2-speed countershaft, just overhauled, Lucas horn, Miller lamp, practically new Dunlop covers, spare unused Dunlop belt, 6 gallons petrol, etc.; £27/10.—Box 809, c/o *The Motor Cycle*. [X8215

Chater-Lea-Jap.

4h.p. 1916 Special Chater-Lea-Jap Coachbuilt Combination, countershaft and clutch, fully equipped, equal to new; £55.—82, Caledonian Rd., N. [1067

8h.p. Chater-Lea-Jap, countershaft, with special designed torpedo sidecar; cost £100, accept £65.—Sutton, Fat Works, Conisborough, near Rotherham. [X8384

4h.p. Chater-Lea-Jap, Bowden countershaft 2-speed, overhauled, re-enamelled; bargain, £27/10; owner enlisted; Chater-Lea sidecar, art cane, screen, apron, less tyre, £4.—Stanley Downs, Gestingthorpe, Essex. [9956

MOTOR CYCLES FOR SALE.

Chater-Lea-Sarolea.

CHATER-LEA-SAROLEA 6h.p. Coachbuilt Combination, mag., spring forks, good tyres and belt; bargain, £12.—88, Grove Rd., Bow. [9936

Clyno

CLYNO 1912 6h.p. Combination; £35/10.—Motor Exchange, Horton St., Halifax. [9967

CLYNO, 6h.p. and coachbuilt sidecar; £55.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [1062

CLYNO, 1914, 6h.p., complete with coachbuilt sidecar, overhauled; £65; extended payments arranged. —Service Co., 292, High Holborn, London. [X8422

CLYNO, 1915, 2¼h.p., mag., disc wheels, practically new; 25 gns.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [1132

CLYNO 1917 New Military Model Combination, with spare wheel; price and machine right; offers.—Potter, Leicester Grove, Blackman Lane, Leeds. [X8136

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

CLYNO, 1914, 5-6h.p., 3-speed, clutch, kick start, all-chain drive, Clyno No. 6 coach sidecar, detachable wheels, electric lighting; cost £100, 52 gns. —Troward's, 78, High St., Hampstead. [1181

Connaught.

1914 Connaught, 2-speed, just overhauled; £24.—Ross, 86, High Rd., Lee. [1086

CONNAUGHT, 2-stroke, 1915; £16/10, bargain.—35, Colwell Rd., E. Dulwich. [1111

CONNAUGHT, 2-stroke, 2-speed, complete with lamp and horn; £35; extended payments arranged.—Service Co., 292, High Holborn, London. [X8430

BIRMINGHAM Agent, P. J. Evans, John Bright St.—1917 models of the famous Connaught two-stroke, standard 2¾-3h.p. models, either solo or with sidecar; miniature models, single or 2-speed countershaft gear; prices from 27 gns. [X8439

Coventry Eagle.

COVENTRY Eagle 1916 Twin Sidecar Combination, 3-speed countershaft; £69/10, or exchange with cash for light car.—Holdsworth, 22, Belvoir Gardens, Halifax. [9966

COVENTRY Eagle 1916 Lightweight, Triumph 2 speeds, run 100 miles only, scarcely scratched, exceptional low position; £35.—Percy and Co., 337, Euston Rd., London. [X8448

Douglas.

1912 Douglas, 2-speed, good order; £24.—Ross, 86, High Rd., Lee. [1091

1914 Douglas, complete, lamps, etc.—Cross, Effingham Sq., Rotherham. [X8412

1917.—Gibb, Douglas Expert, Gloucester, for earliest deliveries of The Motor Cycle. [X8510

1911 Douglas, new tyres, belt, tank, new appearance; £15.—77, Hammersmith Rd., W. [9954

DOUGLAS, 1912½, 2-speed, K.S., like new; £27, offer.—35, Colwell Rd., E. Dulwich. [1110

DOUGLAS, 1915, 2¾h.p., 3-speed Colonial Model; £30.—Ryland, Victoria Barracks, Windsor. [9925

1915 Douglas, 2 speeds, complete, lamps, numbers, etc.; £45.—Cross, Jeweller, Rotherham. [X8410

DOUGLAS, 2-speed, clutch, footboards, etc., good condition; £18/10.—Walsall Garage, Walsall. [X8228

DOUGLAS, 1913, single-speed, excellent running order; £20, no offers.—C/o A.W.N., 248, Bishopsgate, E.C. [1139

1913 Douglas, 2¾h.p., 2-speed, clutch, lamps, horn; £32.—Montgomery, Victoria Rooms, Bristol [X8503

DOUGLAS, 2¾h.p., 2-speed, clutch, kick starter, accessories; bargain, £28/10.—Walsall Garage, Walsall. [X8229

FOR Sale, 1914 Douglas, 2¾h.p., 2-speed model, perfect condition; £30.—2, Abbey Court, Abbey Rd., N.W. [1168

DOUGLAS, 1914, 4h.p., with sidecar, excellent condition; £65, or nearest.—Box L3,386, c/o *The Motor Cycle.* [9914

1914 T.T. 2¾h.p. Douglas, fast, absolutely like new throughout; a bargain, £33.—O. Fox, 85, Edith Grove, Chelsea. [1047

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Yeovil. Tel.: 50. [5855

1913 2-speed Douglas, complete with Lucas lamps, in good order; £30, or near offer.—J. Fancourt, Stamford, Lincs. [X8366

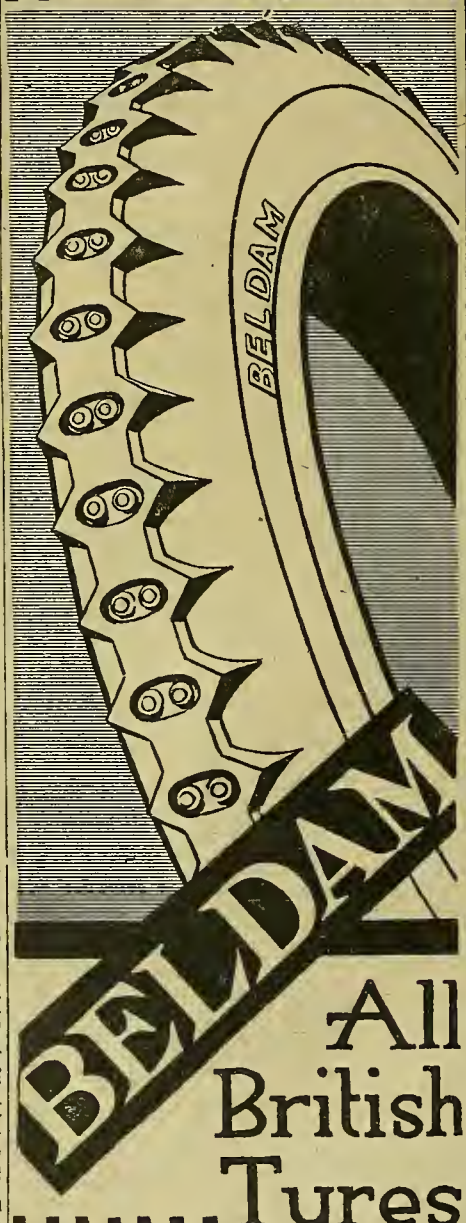
1911 2-speed Douglas, in perfect order, guaranteed, overhauled; £21.—Jones, Garage, Broadway, Muswell Hill, N.10. [9904

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

1914½ Douglas, 2¾h.p., 2-speed, excellent condition throughout, like new; 31 gns.—245, Hammersmith Rd., London, W. [1076

Beldam Retreads

The Plant, Materials, and Men behind BELDAM RETREADS are the same as employed in making the famous Beldam Tyres—Quality is the note all through. Have your old Tyres retreaded in the Beldam way before they get beyond repair. Estimate of cost by return post. — THE BELDAM TYRE CO., LTD., BRENTFORD, MIDDLESEX.



All British Tyres

Write for Prices.

The Beldam Tyre Co., Ltd., Brentford, —— Middlesex.

New Zealand: J. E. Fitzgerald, 139, Lambton Quay, Wellington. Cape Colony: The Tyre and Motor Co., Rodney St., Port Elizabeth. India: Wilkinson and Co., 12, Dalhousie Square E., Calcutta. Ireland: P. Drohan & Sons, Carrick-on-Suir.

Gudbolds

MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS, late 1913, 2¾h.p., 2-speed, lamps, horn, tyres new, very economical; £30.—Mackenzie, J. Block, Section 4, Invergordon. [X7965

DOUGLAS, 1912 (late), 2¾h.p., T.T., 2 speeds, free engine, head lamp, splendid condition; £25.—Webster, Victoria Hotel, Surbiton. [9952

DOUGLAS, 2¾h.p., 3-speed, kick starter, Colonial Model, lamps, horn, speedometer; £47/10.—Coish, Greencroft, Emmer Green, Reading. [X8222

WAR Office Douglas, 2¾h.p., 2-speed, road soiled only, really brand new, mechanically perfect, guaranteed; £53.—Robinson's (below).

1915 2¾h.p. Douglas, 2-speed, semi T.T. bars, 2 Lucas lamp sets, Watford speedometer, horn, etc., in perfect mechanical order; £50.—Robinson's (below).

DOUGLAS, 2¾h.p., latest pattern, absolutely new, including clutch Model W, touring Model U and V; immediate delivery against Minister Munitions permits; special facilities doctors, farmers, national workers.—Full particulars, Robinson's Garage, Green St., Cambridge. [1105

DOUGLAS, 2¾h.p., late 1913, clutch, kick starter, exceptional condition, little used; £31.—"Ranmore," Park Rd., Kingston-on-Thames. [X8508

DOUGLASES, 1913, T.T., 2-speed, 33 gns.; 1914 lady's, 2-speed, clutch, kick start, Binks, 34 gns. —Troward's, 78, High St., Hampstead. [1182

1913 2¾h.p. 2-speed T.T. Douglas, good condition; £28, or exchange with cash for late T.T. Triumph.—85, Central Hill, Upper Norwood. [9927

1914 Douglas, re-bored, 62mm., aluminium pistons fitted, racing cam, new Goodrich tyres, very fast; £40.—William Nixon, Brampton, Cumberland. [X8075

DOUGLAS, 2¾h.p. T.T. Model, 1913-4, re-enamelled and plated, overhauled, new tyres; £32/10; accessories.—Eagles and Co., High St., Acton, London. [X8496

DOUGLAS, 1913, 2-speed, lamp, horn; £32/10; exchanges, deferred terms.—Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green. [9989

DOUGLAS, 2¾h.p., free engine (new), also gear box and carburetter, has not been ridden since overhauled by makers, accessories, tools; £35. Mandle, Merchant, Maryport. [X8376

WAR Office Douglas, 2¾h.p., 1916, 2-speed, trip speedometer, new heavy tyres, P. and H. lamps, guaranteed good as new; £50.—Dr. Gibbons, 84, Connaught Rd., Reading. [9930

1912 Douglas, countershaft 2-speed gear, Amac carburetter, splendid goer; send for our list of new and second-hand motor cycles.—The North Wales Motor Exchange, Holt St., Wrexham. [X8214

DOUGLAS, 1914, 2¾h.p., 2-speed, and clutch, complete with head lamp, generator, rear light, speedometer, Klaxon horn; £40; extended payments arranged. —Service Co., 292, High Holborn, London. [X8423

DOUGLAS, 2¾h.p., 1915, T.T., Colonial Model, for sale, fitted with Stewart speedometer, Sparton horn, Lucas lamp and generator, spare inner tube and belt; £42.—A. E. Cox, 411, Oxford St., W.1. [9953

DOUGLAS, 1915, 2¾h.p. W model, 3-speed, bought new 1916, large P. and H. lamp, 2 generators, Stewart speedometer, horn, spare plugs and belt; £40.—Apply, McNaught and Co., Ltd., Worcester. [X8208

DOUGLAS, 1914½, T.T. Model, semi T.T. bars, 2-speed, in perfect condition, little used, Lucas horn, lamps, many spares, tubes, belt, etc., long exhaust; bargain, lowest £37.—Truscott, Jeweller, Sidmouth. [X7863

1915 2¾h.p. Douglas, delivered from works February, 1916, lamps, and accessories, guaranteed condition as new; owner returning to Front; £45, or near offer.—Write, Gilbey, Summers Hotel, Fulwood, Preston, Lancs [X8416

DOUGLAS, 1913, single-geared, little used, fitted new 1912 cylinders, pistons, good tyres, many new parts, footboards, fast and reliable, a genuinely good machine; £23, or nearest offer.—Jacques Court, Elham, Canterbury. [1143

1914 Douglas, 2¾h.p., T.T., completely equipped and in excellent condition throughout, new footboards, long exhaust, tyres as new, horn, lamps, knee grips, and other extras; bargain, £40.—L. Weston, Much Marcle, Glos. [X8512

DOUGLAS, 1914, 2¾h.p., 2-speed, F.E. clutch, K.S., overhauled 1916, cost over £5, only ridden 30 miles since; owner at Front; all accessories, all as new; £35.—Lockington, 33, Tubbs Rd., Harlesden, London, N.W. Saturdays or Sundays. [X8307

DOUGLAS, 1915, 4h.p., 2 speeds, combination in real good order, 50 gns.; Douglas, 1914, 4h.p., 2 speeds, disc wheels, in good order, £38; Douglas, 1915, 2¾h.p., T.T., 2 speeds, as new, £40; Douglas, 1914, 2¾h.p., T.T., 2 speeds, in nice condition, £35; Douglas, 1913, 2¾h.p., 2 speeds, £27; Douglas, 1912, 2¾h.p., 2 speeds, £21.—Percy and Co., 337, Euston Rd., London. [X8453

Edmund.

YOU Simply Float on an Edmund.—Ourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012

1916 Edmund-Jap, spring frame, Enfield 2-speed gear, little used, condition as new; 38 gns.—115, Gt. Portland St., W. [1009

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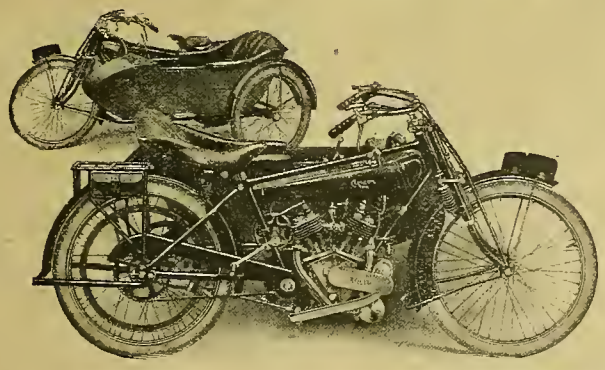

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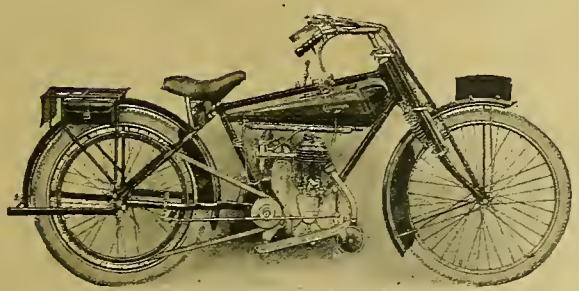
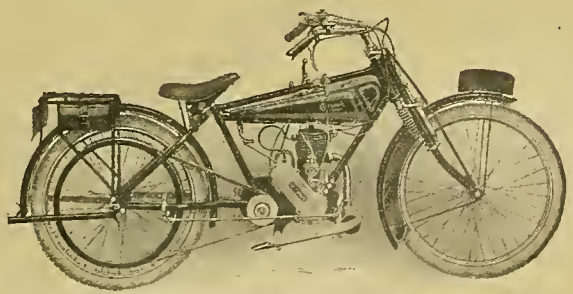


THE CALTHORPE-J.A.P.



THE CALTHORPE TWO-STROKE.

R.H.S.

Not once—

—but many times have we been asked the question "When can you deliver the CLYNO"? We cannot give any definite answer to that question, for our entire resources are still being utilized to meet Government demands, but at the earliest opportunity we shall concentrate on supplying private requirements for

CLYNO

THE Sidecar Machine—and we can confidently promise that it will be an even better machine than in the past.

For as a result of its great War Service experience, the CLYNO will embody many valuable new features, which will mean increased efficiency and better service. Therefore keep the CLYNO in mind—it will be well worth waiting for.

The CLYNO Engineering Co.,
Wolverhampton.

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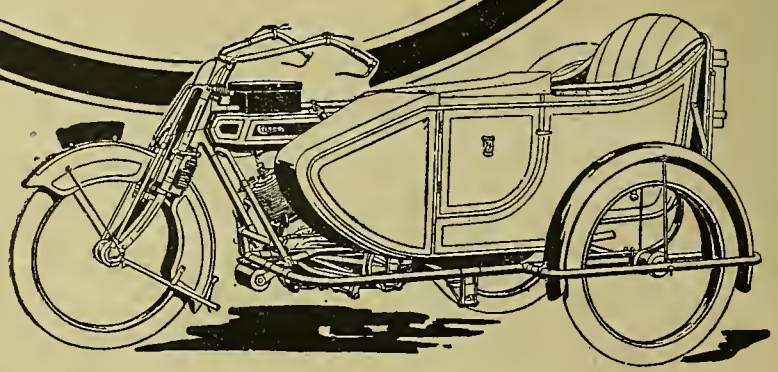
Telephone: 992, Wolverhampton.



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ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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A Million Pound Overseas Trade.

SIGNS are not wanting that British motor cycle manufacturers are carefully considering plans for Overseas trade after the war. We are glad to note the tendency; the importance of the markets demands consideration, and it is highly gratifying to us of *The Motor Cycle*, who have urged the claims of the Overseas market for years past. Appreciating the excellent qualities of the British machine, both in the matter of finish and long wearing qualities, we have championed the cause of the British motor cycle in our Colonies and Overseas Dominions, and, in fact, in every country where motor cycles are used. By our unceasing flow of correspondence we can judge the feeling toward the British motor cycle, and we know that a magnificent opportunity awaits the enterprising manufacturer who will devote his attention to a study of Overseas requirements. British workmanship has deservedly won a great name throughout the world, and a splendid reception is assured to makers who will introduce any desirable points in the design of a machine to render it particularly suitable for Overseas work, and at the same time eliminate undesirable features. A special design is not necessary in seventy-five per cent. of countries. It is a portent of the popularity of British machines abroad that so many enthusiastic motor cyclists in every country where motor cycles are used take the trouble to write to this journal drawing attention to desirable points in the specification and commenting upon details which may not be popular, or which may be open to improvement to suit them for the special conditions prevailing abroad.

Early Development of the Trade.

Happily there is no question of British supremacy, but our hold is threatened, for American machines are good and up-to-date, and we must not rest upon our laurels. Britishers may take justifiable pride in the fact that they successfully grappled with the problem of perfecting the motor cycle in the early days, and their spade work has developed an unlimited demand throughout the world.

It seems only just, therefore, that the volume of the world's trade in motor cycles should be largely shared by this country, though the million pound trade prior to the war is as nothing compared with what it may be when peace returns. Who could name its limitations with proper cultivation and attention to minor points of design, improved handling and distribution, as well as fixed prices for machines, in addition to spare parts—points which have caused grumbles in the past? We are confident that our propaganda work of the past five or six years will not have been in vain. We never want to see again the enthusiasm of Overseas users of British machines damped by some petty annoyance, the source of which could very well be eliminated by ordinary care.

Export Figures.

As evidence of the rapidly growing Overseas demand for British motor cycles and the volume of exports, we have collected figures for the past six years which will be impressive to every manufacturer in search of new fields. With the promise of preferential tariffs for countries within the British Empire, it is easy to understand that the figures may very rapidly be trebled when quantity production enables sufficient machines to be released from the home markets. In this connection it should be remembered that it is generally agreed that piecemeal production is a thing of the past. The war has taught us many lessons, among them efficient factory organisation and equipment for quantity production, and the use of metals, particularly the lighter alloys. It has, too, brought in its wake huge factories, thousands of the latest labour-saving machine tools, and obviously after the war one of the problems will be to keep these machine tools

An index to the advertisements in this issue will be found on the page facing the back cover.

A Million Pound Overseas Trade.—

and factories fully occupied. The motor cycle firms unquestionably have the opportunity to extend their trade Overseas, as the following figures of our growing trade—though checked by the intervention of war—will show :

BRITISH EXPORTS OF MOTOR CYCLES.

	1911.	1912.	1913.	1914.	1915.	1916.
Number of machines ..	7,357	13,055	16,850	20,877	10,927	12,851
Value of machines.....	£278,856	£528,496	£734,319	£958,473	£510,374	£595,067
Value of all parts, accessories, spares, etc.	£79,110	£186,378	£258,948	£346,777	£311,372	£364,485
Totals ...	£357,966	£714,874	£993,267	£1,305,250	£821,746	£959,552

We also quote the import figures, since they afford interesting data as to home demands for motor cycles of foreign origin. It should be borne in mind that prior to the war foreign-made machines entered this country without a tariff, but latterly, until the prohibition, a 33⅓% tariff was imposed. It is generally considered that this or a similar tariff will remain in existence—for a period of years at any rate—after the conclusion of the war to assist British manufacturers in rebuilding their shattered trade.

BRITISH IMPORTS.

	1911.	1912.	1913.	1914.	1915.	1916.
Number of machines ..	1,351	1,363	1,728	2,559	4,531	1,192
Value of machines.....	£42,086	£44,252	£60,332	£93,121	£205,817	£50,478
Value of all parts, accessories, spares, etc.	£65,716	£192,423	£206,451	£94,540	£157,506	£125,537
Totals ...	£107,802	£236,675	£266,783	£187,661	£363,323	£176,015

Valuable Markets Abroad.

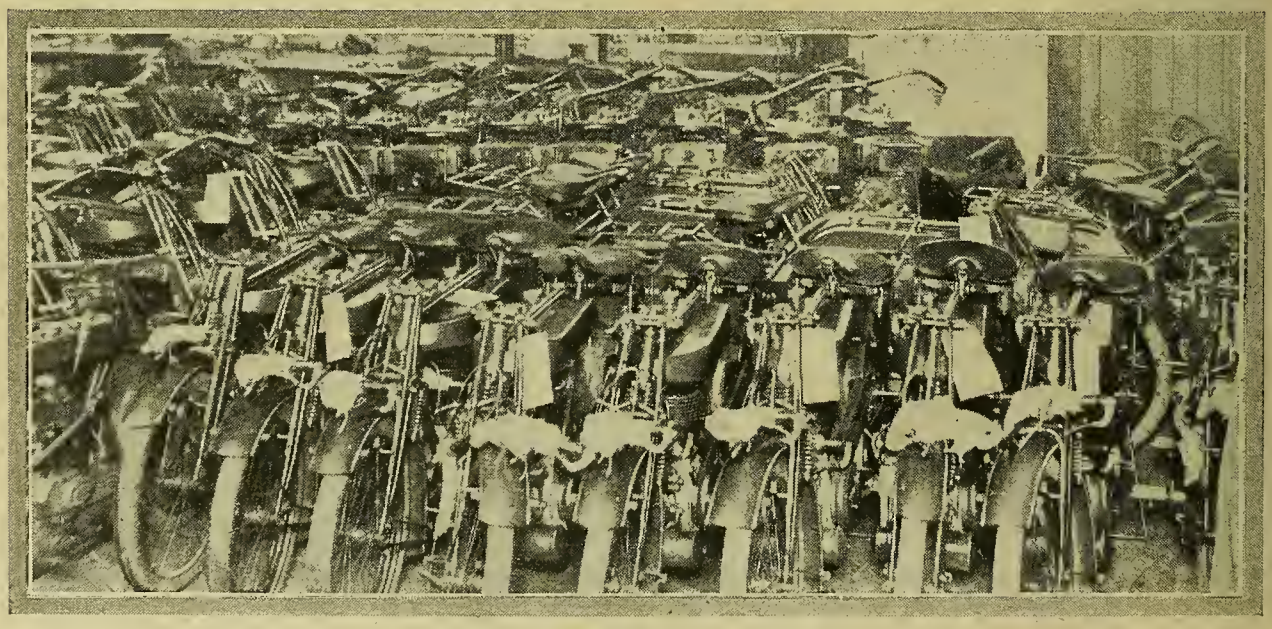
It would be difficult to name the country having the largest potential field for British products. Australia with its untold wealth has been of late a valuable hunting ground for the American manufacturer, though British machines are imported in large numbers. New Zealand, Canada, and India have immense possibilities, whilst the trade in South Africa is considerable. We have before us official figures showing the British exports to South Africa for the past three years, and they are quoted for guidance :

1914.	1915.	1916.
£160,283 ..	£91,369 ..	£140,449

South America, too, will appeal to manufacturers, but there are other countries, such as Spain and Scandinavia (not to mention Allies—countries which, in most cases, have factories of their own), for they also, if only they are encouraged and their trade sought, will prove extensive buyers of British goods. We cannot, however, do better than to refer manufacturers genuinely interested in Overseas markets to the maps, which form a guide to road conditions, published in our issue for March 1st last and in the current issue, for wherever there are roads motor cycles can be ridden, and by reason of their low first cost, economy of running, and the wonderful stage of reliability they have now attained, they are bound to make a strong appeal, particularly in scattered districts and countries which are sparsely populated.

Australia's Base Metals for England.

According to a Reuter message from Melbourne, dated March 28th, the Chairman of the Stock Exchange announces that Mr. Hughes, the Federal Prime Minister, has sold to Great Britain the Commonwealth's output of base metals for the next ten years at a good price.



BIG SINGLE NORTONS FOR OVERSEAS.

A batch of Norton "Big Fours" ready for despatch to the Eastern Front, being part of a Russian Government order. An illustrated description of this model appeared in our issue of March 22nd.

Occasional Comments by "Ixion."

Paraffin.

I SUPPOSE readers understand that it is now illegal to use paraffin as a motor cycle fuel unless it is formally entered on their permit card in lieu of an equivalent quantity of petrol. There are obvious possibilities of dodging the regulations in this matter, and one presumes that the penalty on anybody who is caught carburetting unlicensed paraffin will be extremely severe. The newest road terror will be reminiscent of a milk round; we shall be stopped by inspectors, who will take samples of the contents of our tanks for analysis!

Long Inlet Pipes.

MR. L. WALLACE surely misses the real point of the controversy anent the respective merits of long and short inlet pipes. The engineers named by him as recommending short inlet pipes plump for the stumpy pipe because only a short inlet pipe can be kept at the desirable *temperature* by conduction of heat from the cylinder. Mr. Bardshaw's point is that if the air supply be adequately heated, a long inlet pipe can be kept as warm as a short one; and the secondary point is the question whether, given the same temperature in both cases, a long inlet pipe does not minimise blowback, and make for a properly broken up mixture. Mr. Wallace must be aware that motor car engines and aero engines up to twelve cylinders have inlet pipes of enormous length and cubical capacity, and give very high efficiency curves, simply because the inlet pipe is warmed. The factor of blowback should prove interesting to those qualified for its discussion. I have been testing six machines in this respect; two were vertical singles with the usual 3in. inlet pipe, two were 7 h.p. twins with longer pipes, and two were flat twins with extremely elongated pipes. Blowback was apparently non-existent in the two last cases—a sheet of blotting paper held close up against the air intake was not damped. There was a slight but perceptible wet blowback with both the V twins, and there was a great waste of spirit with both the vertical singles.

About Spring Frames.

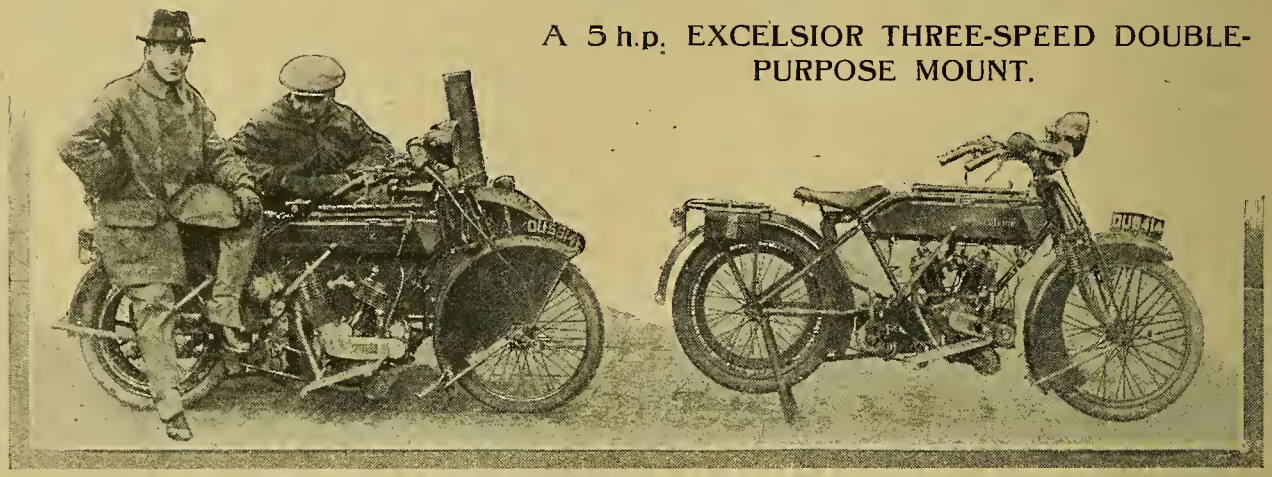
A WELL-KNOWN designer writes from "somewhere in France" to say that the war has made him an enthusiastic convert to full springing for motor cycles. He is stationed in a district where the roads are notoriously bad, where even the best and staunchest cars snap their springs like carrots with disgusting frequency, and where thirteen of the thirty-eight motor cycles under his charge have broken some part of their frame in the last six months. His ideas on the perfect spring frame are not quite defined as yet, because he finds it difficult to unite all the desiderata in one design. But he plumps for the helical spring (as used on the Matchless, for example) as against the leaf spring, for the very excellent reason that it is a great deal lighter. Those of us who know how spring frames tend to increase weight will appreciate the point. Helical springs, nevertheless, suffer from two demerits: they have less intrinsic lateral rigidity than leaf springs, and a clumsy designer may save weight by adopting them, and lose it on the device which he must add to prevent "roll"; and they are very lively, because they possess no internal friction, and so require damping by means of a dashpot (*cf.* the old A.S.L. machines) or a friction pad (*cf.* the Truffault fork, fitted to the old Vindec machine). For some mysterious reason the writer's post-war model is to have shock absorbers in addition to its main springs; I say "mysterious reason" because my experience is that a decent spring frame seems quite efficient against both big and little shocks. I have always supposed that sprung motor cycles compared favourably with cars in this respect, because the designer has to reckon with a fixed weight, whereas the load on a car may vary from time to time by as much as fifty stone or so.

A Stepping-stone Sparking Plug.

A WILY American has invented a plug on stepping-stone lines, which aims at providing four separate sparks. The central electrode is an Irishman, and projects close to the outer edge of the insulator; from it the current jumps to a second electrode, which is insulated from earth, but ends in a third electrode, projecting from the insulator, whence the spark jumps its second gap to a fourth electrode, and so on, until the weary current, after its fourth hop, at last reaches a solid sort of electrode which is bedded in the metal shell of the plug, and leads it back to earth at last. I daresay the plug will really and truly give its four sparks for quite a time on American car engines, which usually prefer to explode rather woollily, and do not supercompress their charges. But if it were mounted in a British engine, I shrewdly suspect that the fine points would soon incandesce to some tune and set up preignition, and that before so very long the repeated high-power explosions would waft the business end of the plug out through the exhaust valve. The next application of this principle will take the form of jumping the current from the plug electrode round a series of stepping-stone electrodes, sunk in miniature insulators all round the internal periphery of the cylinder head, until the resultant firework display (unfortunately invisible!) reminds us of the gas jets outside a butcher's shop in Ratcliff Highway. This *might* give a genuine increase of power; but I do not fancy that four sparks set within the half-inch ring of a single plug can make much difference to efficiency. I wonder if the four gaps will make the current more determined in burning oil off the points, or whether it will merely scamper without sparking over any sooted gaps until all four are sooted? Will some electrician oblige—without logarithms, if possible, as my trigonometry is somewhat rusty?

TEST OF AN OVERSEAS MODEL.

A 5 h.p. EXCELSIOR THREE-SPEED DOUBLE-PURPOSE MOUNT.

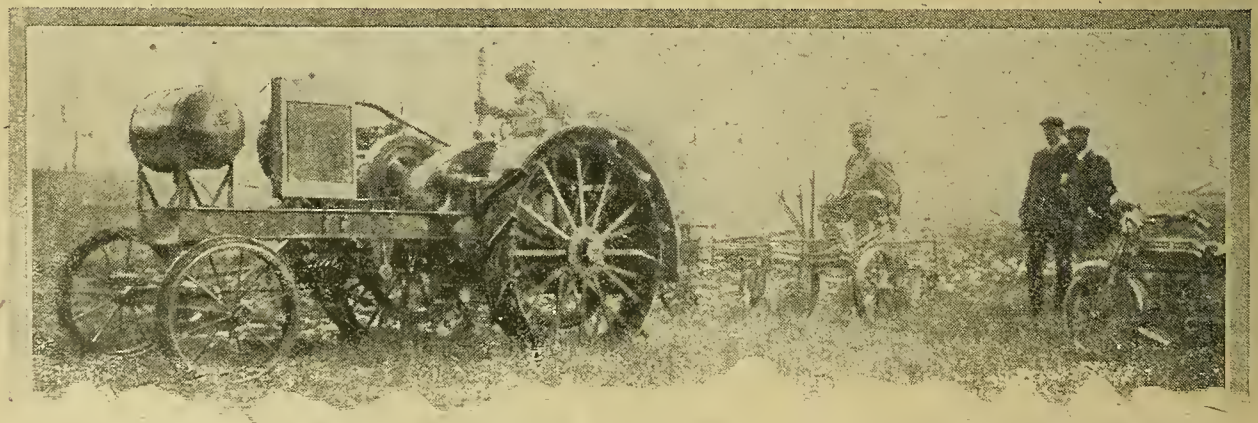


An 8 h.p. Excelsior sidecar, and the special 5 h.p. 654 c.c. solo mount, used on the occasion of the test.

THE Russian Government orders for motor cycles are keeping many factories busy at the present time, and the extent of the order serves to show the high esteem in which motor cycles are held by modern armies. Other factories might also have shared in the order had a sufficiency of parts been available, one of these being the makers of the Excelsior, Messrs. Bayliss, Thomas, and Co., Ltd. The Excelsior has a Sturmey-Archer gear, but so great is the call upon the Nottingham factory for gears for war model motor cycles that they were unable to guarantee any more. It was a sore disappointment to the makers of the Excelsior, who had built up a specimen Overseas machine with a 5 h.p. J.A.P. twin engine of 70 × 85 mm. bore and stroke = 654 c.c. capacity. It being quite a departure for the firm, Mr. W. H. Carson recently invited us to test the capabilities of this new model on any hills and rough going we chose, and we accordingly selected the Edge Hill range, Mr. Carson accompanying us on his 8 h.p. sidecar.

The luxurious Millford double-seater sidecar. The passenger is occupying the forward seat, the rear portion being covered by hood material.

We sallied forth on a cold day in March—that month of many weathers which upheld its reputation on this trip. Light snowflakes were falling as we headed for Warwick through Barford on to Wellesbourne; later the sun shone, and for the most part it was fine, but on the summit of the



SCENE EN ROUTE.

An "Overtime" farm tractor at work with a four-furrow plough. The twin-cylinder engine of the tractor runs on paraffin.

Test of an Overseas Model.—

range a veritable blizzard was experienced, a north-easterly wind springing up with remarkable suddenness and cutting like emery powder, at the same time driving the thick snow dead in our teeth. There was no shelter, so it just had to be faced.

But the machine! From the first we felt at home on the strange mount, the S.A. gear being an old favourite. The little twin, tuned to perfection, answered to its throttle lever in a manner that motor cyclists alone of all users of touring vehicles experience as a result of high power and light load, and hills once regarded as severe now seemed as level ground.

The "Round Tower" at the summit of Edge Hills, a familiar landmark to Midland motorists.

A Motor Farm Tractor as a Novelty.

Near Wellesbourne a distant glimpse of a motor tractor at work was too strong an attraction, so a digression was made along a by-lane to the scene of this wartime innovation. Just fancy being as curious as schoolboys in a farm tractor! Probably in a year or two we shall laugh at the experience! We found the owner surveying the work done and comparing it with the work of a horse plough. He was most courteous and communicative. His "Overtime" tractor had cost him £285 in the autumn, which figure had appreciated to the extent of £40 in the interim. It was hauling a Cockshutt four-furrow plough, and though new and not at that time continuously employed, he estimated its ability as eight to ten acres per day against one acre of the horse plough. The engine ran on paraffin, which cost him 1s. 2d. per gallon, the consumption being approximately two gallons per acre. Perhaps naturally, he was delighted with the experiment, and had declined a Government overture to relieve him of his tractor and complete his ploughing at a certain figure per acre.

Renewing our journey, incidentally having no difficulty in piloting the Excelsior over the rough edges and approach to the ploughed area, we had an opportunity of letting the machine out on the respectable rises leading to Kineton. On Edge Hill we gave the engine its head, just got round the bend without switching off, and, still maintaining over 30 m.p.h., were within sight of the summit when the engine suddenly "dried up"—or rather, we should say, that the carburetter dried up. So it seemed to us, however, though our thickly-gloved hand, which immediately found its way to the float chamber, could not determine the point absolutely. The occupants of the sidecar which was following in our wake had the opportunity of a good laugh as they sped by. Descending the hill, another attempt was made, this time with the plunger of the float chamber depressed to ensure a good head of petrol. The good J.A.P. hardly slowed a tick, and got over the crest at a lively bat on top gear. Having proved that the original trouble was a low petrol level, the Amac float cover was whipped off and the slide on the needle moved $\frac{1}{32}$in. higher. A subsequent test determined the accuracy of the adjustment.

"SOME LOAD." A steam tractor with a heavy load of timber at the foot of Sunrising. Needless to remark, the road surface was not improved by the tractor or the timber wagon.

Test of an Overseas Model.—

Curiously enough, this very slight adjustment corrected a little trouble we noticed in dribbling through the villages on the route, viz., the refusal of the engine to slow down on top gear to a slow rate of speed with both cylinders firing regularly. As a result of the raising of the level the engine was suddenly "tamed" and would now tick along on top gear, besides which it was controllable to a degree when the engine was in the free position.

Continuing along the ridge and descending Sunrising, we turned at the foot, and again no difficulty was experienced in accounting for a 1 in 6 ascent, the machine showing willingness to pick up again after necessarily retarding speed for the bend.

Hill-climbing having been proved child's play even on a top gear of 4.5 to 1, we turned off the beaten track in search of abnormal surfaces, once landing in a turnip field. On slippery mud and over deep cart ruts, one's sense of control was complete, thanks to the handle-bar clutch and conveniently placed levers combined with the general good balance of the machine, notwithstanding its six inches ground clearance.

An ominous black cloud put an end to the "overseas" tests. It heralded a real March "lion."

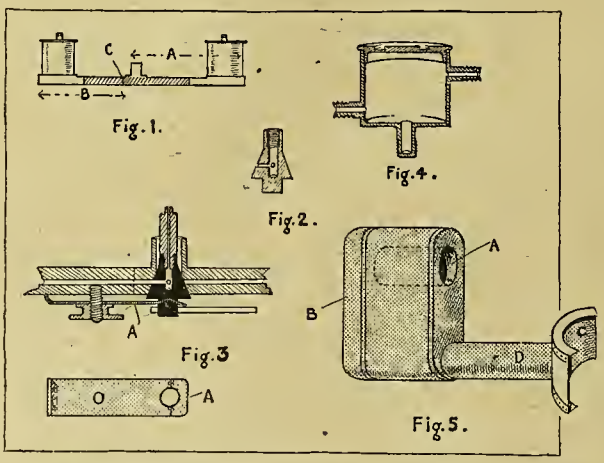
At this altitude the wind cut to the bone, the thick snowflakes beating into one's face like ice. Owing to the fury of the blizzard the riders several times nearly gave up—but they couldn't, as there was a hot lunch they had ordered getting cold at the Round Tower!

The trip home, mostly in sunshine, served to accentuate the excellent qualities of this smooth-running long stroke Excelsior-Jap. It is to be hoped that the makers will standardise the model, for it represents an ideal type of double-purpose motor cycle for home or overseas use. We took the opportunity of weighing the machine on arrival home. Fully equipped and including clips for attaching a sidecar it scaled 272 lb.

PETROL OR PARAFFIN.

A Successful Method of using Heavy or Light Fuels.

SINCE petrol has been more or less unobtainable, many designs and alterations to the ordinary carburetter have appeared in *The Motor Cycle* showing methods whereby the heavier fuels may be used with success. It may be mentioned here the calorific value of paraffin is somewhat greater than petrol, but theoretically this advantage is negatived by the fact that in order to use paraffin successfully both it and the air have to be heated, and therefore a lighter or more attenuated charge is taken into the cylinder on the induction stroke. The following method adopted by the writer to utilise paraffin has given quite good results. Nearly all the methods which have already been tried, with the exception of one or two, fail in regard to the ability to change quickly from paraffin to petrol, or *vice versâ*.



Diagrams of a device which permits paraffin to be used successfully. A special feature about it is that its use enables one to change the fuel quickly from paraffin to petrol or *vice versa*

In the writer's case, two separate float chambers were used in conjunction with a Senspray carburetter. The metal portion joining the float chamber to the jet (see fig. 1) was joined up to another float chamber B, it being sweated with solder at C, and to strengthen the joint two strips of sheet brass were soldered to the sides (see shaded portion).

Heating the Paraffin.

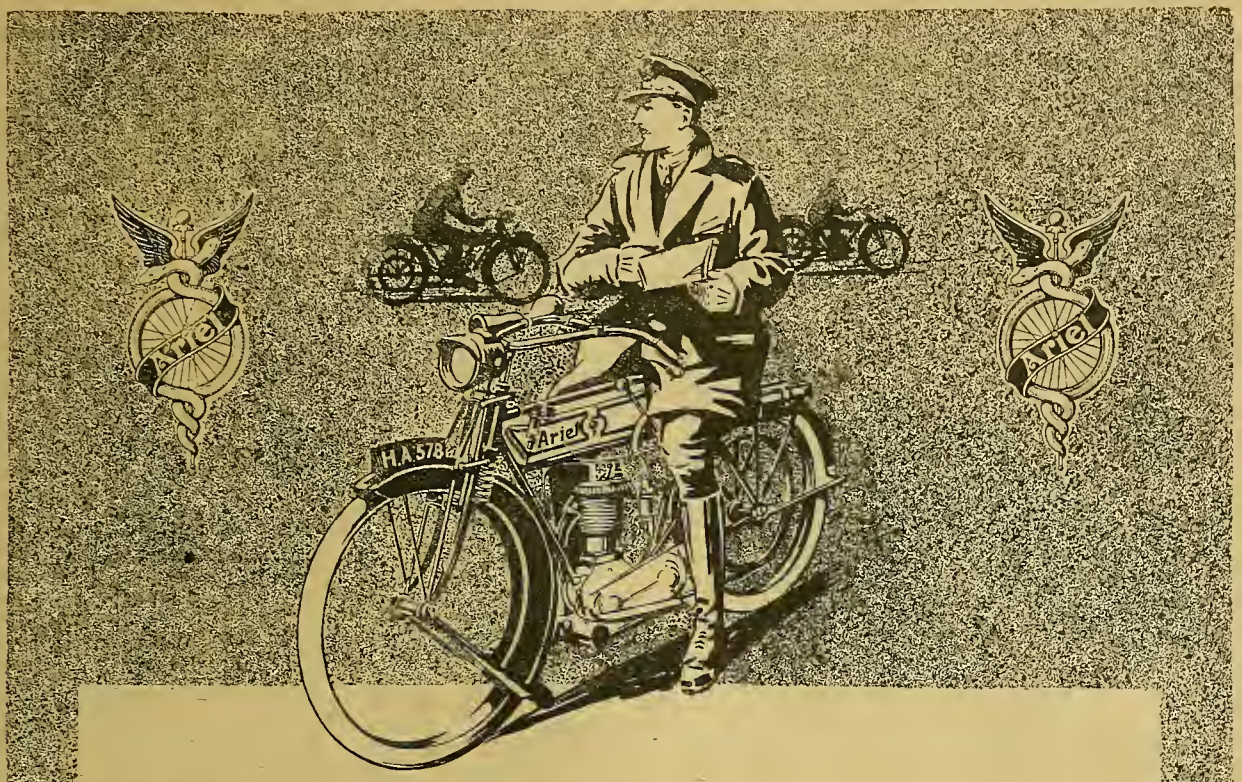
The jet and base piece with thread was discarded, and a new base piece made without the outside screw-in thread (see fig. 2). This taper joint was ground into the old hole to form a tap plug, and has two holes drilled in it as shown, so that when rotated the holes coincided with the petrol passage to either one or other of the float chambers. This plug is kept in position by means of a spring blade A and milled nut, as shown in fig. 3, so that the jet is easily removed for cleaning purposes. The base piece of the jet has a square head in which a small lever is permanently attached. The paraffin supply is heated before passing into the float chamber, it being conveyed from the tank to a small heating chamber screwed into the top of the cylinder with a removable lid for cleaning purposes (see fig. 4), the inlet and outlet being arranged so that the cold paraffin passes into the base of the chamber, and the heated paraffin out at the top.

The Hot Air Collector

A hot air collector was made of thin gauge sheet brass of the shape shown in fig. 5, the hole A being made so that it is a somewhat tight fit on to the carburetter inlet gauze cage. The part C was made to fit round the cylinder and exhaust valve chamber flanges, the hot air being conducted by the tube D. The end piece B of the heat conductor was well belled out to restrict the flow of air as little as possible.

With these alterations it is quite easy to change from petrol to paraffin whilst the engine is running; it makes starting quite easy, and, provided the paraffin is properly vaporised and sufficient air given, very little difference can be detected in the running.

LEONARD R. JONES.



In War—

as in peace

—the Ariel has completely defeated all attempts to wrest from it motor cycle supremacy.

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ARIEL WORKS, LTD., 3, BOURNBROOK, BIRMINGHAM.

Ariel

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Considering the resources of the Mills from which Clincher Tyres emanate, this consistently good service is not surprising. The marvellous efficiency of the machinery employed; the complete equipment of the scientific laboratories; and the care bestowed upon every process in the manufacture of Clincher Tyres—these are the main factors that have made Clincher Tyres superior.

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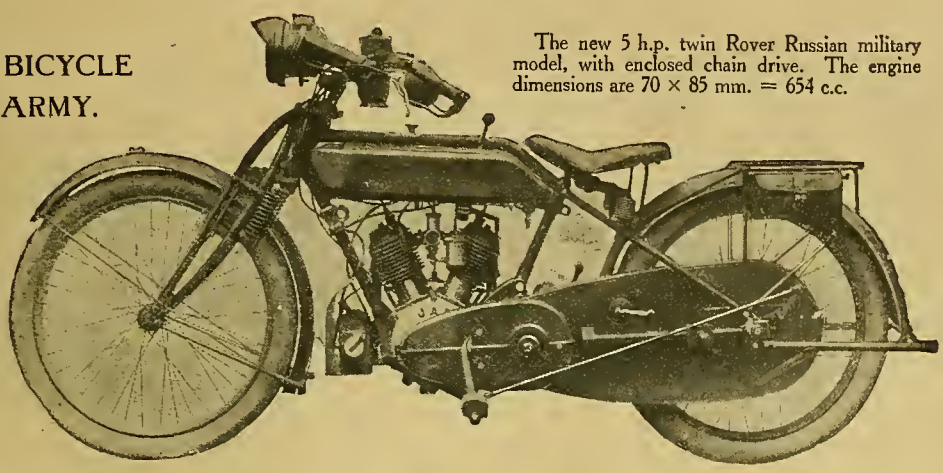
A TWIN-CYLINDER CHAIN-DRIVEN ROVER.

ANOTHER TYPE OF MOTOR BICYCLE FOR THE RUSSIAN ARMY.

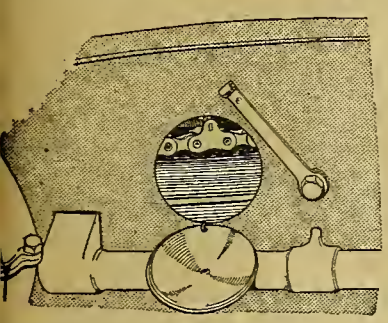
5 h.p. V-TYPE ENGINE, THREE-SPEED COUNTERSHAFT GEAR, ENCLOSED CHAIN DRIVE, 28 x 3in. TYRES.



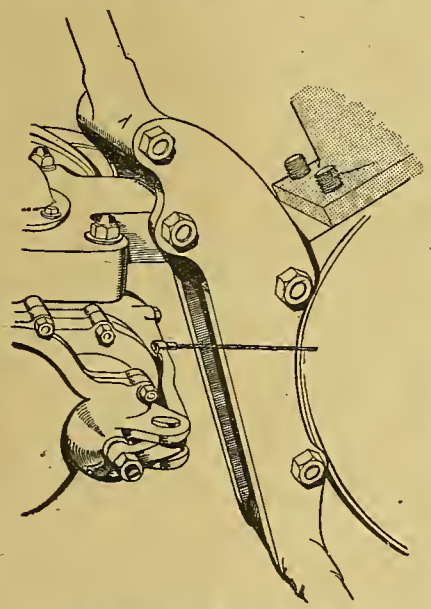
The new 5 h.p. twin Rover Russian military model, with enclosed chain drive. The engine dimensions are 70 × 85 mm. = 654 c.c.

AN ardent reader may be forgiven for suspecting a mistake in the above heading, but it is quite correct. The New Rover Co., of Coventry, hitherto exclusively single-cylinder adherents, have just produced a medium-powered V twin model. The Ministry of Munitions Order for machines intended for Russia is causing busy scenes in some of our principal factories, and, despite certain points which may here and there be quibbled over, the departures from regular practice are likely to operate advantageously for the motor cyclist of the future, particularly the Overseas rider. This Russian model is a combination embracing most of the well-known Rover points of design, and is fitted with a 5 h.p. V twin J.A.P. engine, 70 × 85 mm. or 654 c.c. There is nothing unusual in this power unit, which is the standard J.A.P. type, the novelty being in the building of this engine into the Rover frame, which has been redesigned to give the necessary ground clearance, etc. It suffices to say that the machine throughout has the usual Rover solidity and admirable workmanship.

The drive is all-chain through the usual Rover three-speed countershaft gear box. The engine countershaft portion of the drive is by a Coventry Silent chain, in accordance with usual Rover practice, whilst in the main drive there is a departure in the use of the Brampton patent spring link chain, running in an oil bath casing. This novel chain has been under test for a year or two. It is $\frac{3}{8}$in. pitch × $\frac{1}{2}$in. wide in this case, and it carries a spring in compression between the upward extensions of the side plates, which form a kind of bridge over each link. The spring comes into action as the chain straightens up under load, thus absorbing engine snatch in a very ingenious way. It has apparently proved so reliable that the Rover are pinning their faith to it, and dispensing with the usual shock absorber. The whole drive is enclosed in a neat, strong, and easily detachable metal casing. A circular hole with cover plate in the side of this casing gives access to the chains for lubrication. The gears are operated by a lever placed in a slot in the tank, a regular Rover feature. The clutch has handle-bar control, and the standard type of kick starter is fitted.



The inspection port in the side of the chain casing.



The redesigned Rover engine cradle and gear box carrier, which gives the increased ground clearance. The clutch operating lever may be noted.

A Foreign-made Magneto.

The magneto fitted to the machine which we illustrate is an E.I.C., which is giving every satisfaction. We casually expressed pleasure in examining the machine that it was all-British, and were astonished to learn that the machines will have an American magneto in accordance with the specification laid down. Words fail us!

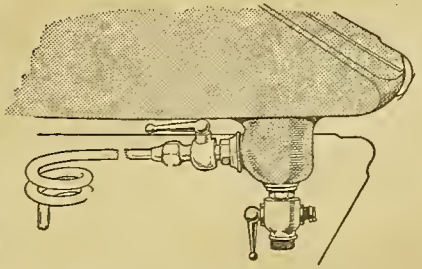
A B. and B. carburetter of the ordinary type without a pilot jet is fitted to the forerunner of the batch in course of production.

A very efficient internal expanding back brake, operated by a lever in front of the left footrest, and the usual Rover front brake, give all the retarding influence needed.

The large tank, accommodating two gallons of petrol and a quart of oil, is provided with a special sump and filter, with two taps. Druid forks and Terry spring links are fitted.

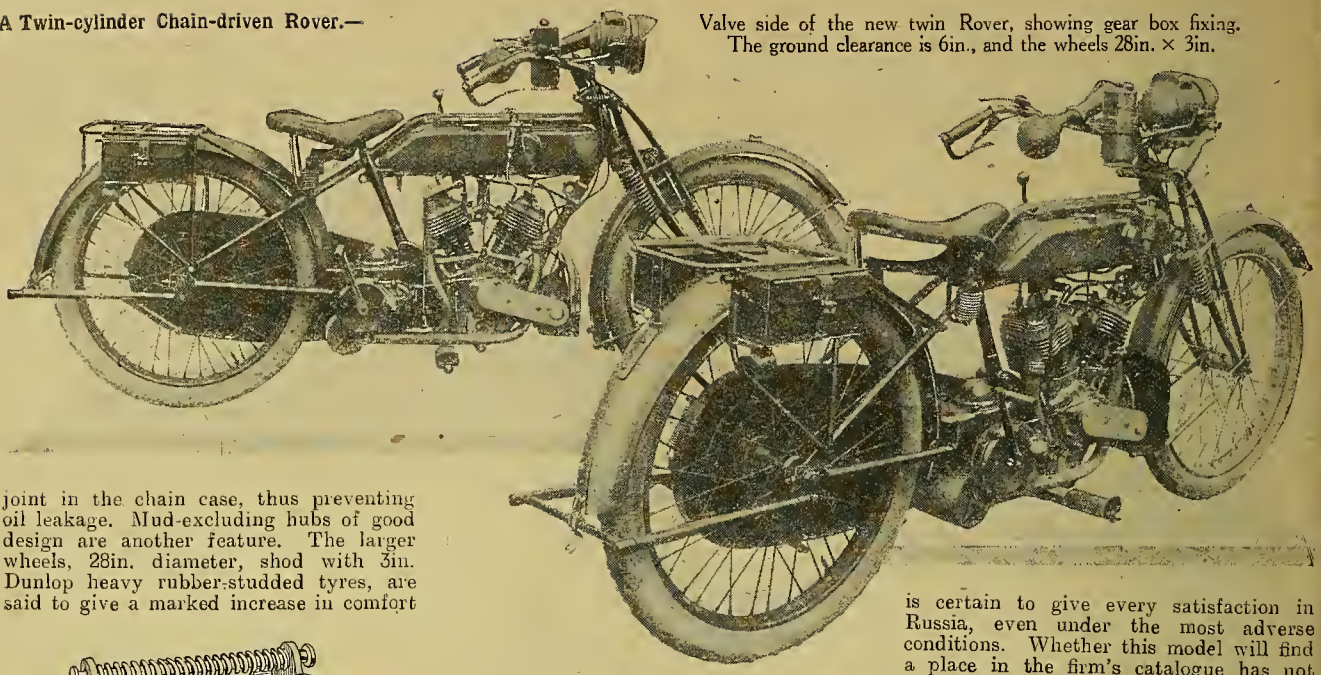
Protection for the Bearings.

A small but interesting point is a large flexible coil spring on the engine-shaft between the crank case and chain case, which presses a felt washer over the



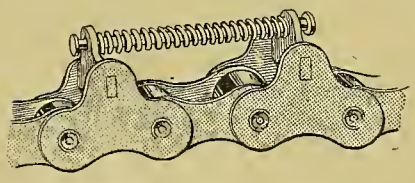
A sump is provided at the back end of the tank, a filter and twin taps being combined with it.

A Twin-cylinder Chain-driven Rover.—



Valve side of the new twin Rover, showing gear box fixing. The ground clearance is 6in., and the wheels 28in. × 3in.

joint in the chain case, thus preventing oil leakage. Mud-excluding hubs of good design are another feature. The larger wheels, 28in. diameter, shod with 3in. Dunlop heavy rubber-studded tyres, are said to give a marked increase in comfort on pot-holey roads. This is a feature which we hope has come to stay in British design. A Klaxon mechanical horn is specified to be fitted on the handle-bar in this case. The specification asks for a guaranteed speed of 50 m.p.h., and the model in question is capable of exceeding this speed, and should touch the 60 mark. Taken altogether, we think the Rover is certain to give every satisfaction in Russia, even under the most adverse conditions. Whether this model will find a place in the firm's catalogue has not been considered yet. Many British and Overseas riders will consider it an ideal all-weather mount, and we feel sure it would be in great demand for solo and sidecar work. But the New Rover Co.'s manager, Mr. Allen, would not at this stage commit himself as to whether this new model would find a place in their catalogue after the war.



The Brampton spring link chain—a novel method of absorbing engine shocks.

A SPRING FRAME L.M.C.

Outline of a Post-war Model for Home and Overseas.

THE L.M.C. motor cycle has gained for itself an excellent name both at home and abroad. The 4 h.p. model of this make has competed with remarkable consistency in all the important trials of the past few years. It will be recalled that at the time war broke out the company introduced a 6 h.p. twin machine of engine dimensions 79 mm. × 86 mm. = 842 c.c. The few examples of this machine which are existent have now received continuous testing, and the company's intentions at the moment are that they will, after the war, standardise this twin mount with a three-speed countershaft gear, spring frame, and spring fork, and 28in. × 3in. tyres. This will prove interesting news to Overseas motor cyclists, of whose needs the Lloyd Motor Engineering Co. have first hand experience. Ample ground clearance is to be provided, and sidecar attachment lugs will be incorporated with the frame. The tank is to be considerably enlarged.

The L.M.C. will have, too, a special sidecar chassis to suit the machine, and the whole outfit is intentionally being plotted out of enormous strength in order to withstand the strain of the sandy and rough colonial roads.

OIL POOL ARRANGED.

Business on Co-operative Basis.

A WEEK ago the statement was made in *The Motor Cycle* that feeling was growing in support of a suggestion that the companies which control the distribution of petroleum in this country should agree for the period of the war to pool their stocks, tonnage, storage depots, and also their transport facilities.

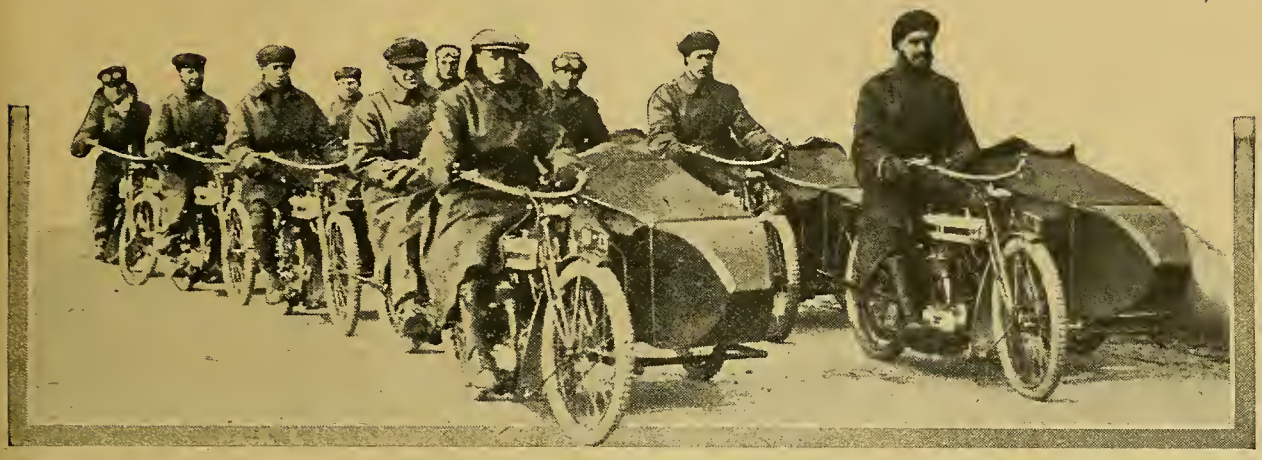
In the House of Commons recently, Mr. G. H. Roberts, in reply to a question by Mr. Joynson-Hicks, said that the Ministry of Munitions, the Admiralty, and the Board of Trade had intimated to the principal importers and distributers of petrol products that it was desirable to take the step above referred to. The organisation for such a pool was now practically complete, and the scheme would shortly be in full working order.

A Favourable Conference.

The chief firms engaged in the industry have recently held a number of conferences to consider whether a pooling arrangement could be devised which would ensure the more efficient regulation of the supply of oil essential to the conduct of the war, and at these meetings (states *The Times*) an excellent spirit was shown. The principle of a pool has been unanimously accepted by the companies, and considerable progress has been made in regard to the production of a detailed scheme. It is probable that when the pool is put into operation the use of trade names of motor spirit, as well as of kerosene, will be suspended for the period during which the arrangement remains in force.

The pool will be of great value to the country during the war, and the companies are to be commended on the public service they will render by agreeing to conduct their highly essential business on a co-operative instead of a competitive basis.

SIDECARS FOR THE R.F.C.



SIDECARS FOR MILITARY PURPOSES.
A batch of Triumph-Gloria sidecar outfits under test for the Royal Flying Corps.

OUR photographs show the Triumph-Gloria combination, a batch of which have recently been supplied to the Royal Flying Corps. The bicycle is the standard 4 h.p. three-speed Triumph with slightly lower gear ratios, a 5¼ to 1 top being used in lieu of the 5 to 1 ratio usually arranged on the War Office Triumph.

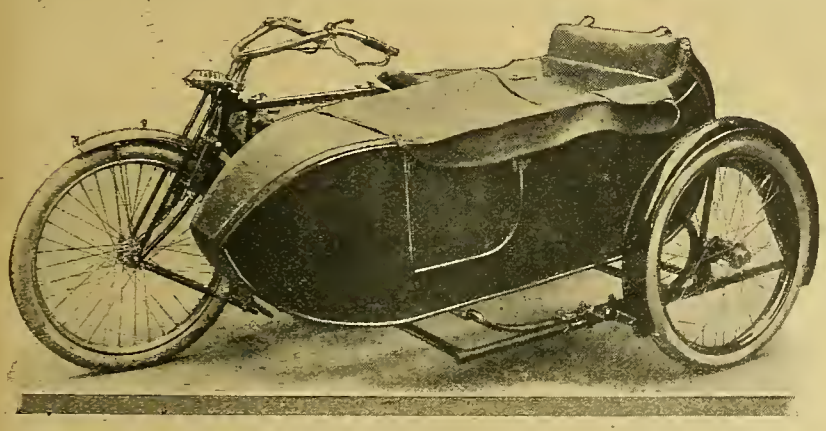
The sidecar is a very neat coachbuilt affair made by the Gloria Cycle Co., Ltd., and has four separate attachments to the motor bicycle. It will be noticed that the rear of the body is of rotund shape, which provides a very convenient receptacle for tools and spares. To obtain access to the compartment, the back-rest is slid upwards, so exposing the whole of the contents. On the chassis there is a lamp bracket arranged extremely low down, so that the full lighting effect is obtained on the road. When not in use the sidecar is covered by a neat waterproof apron secured by spring buttons as shown.

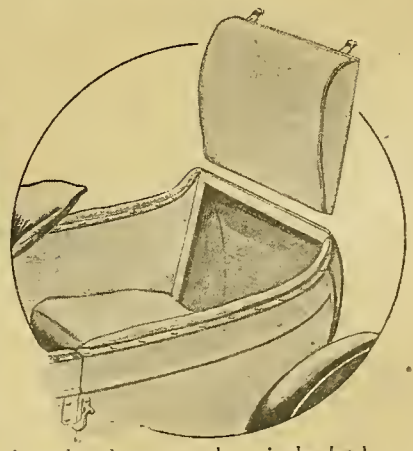
Do we see in the more extensive adoption of the sidecar by the Military Authorities a step towards economy? Are these low-priced passenger outfits, which are the essence of reliability and consume very little petrol and oil, to displace the high-powered five-seater cars which are a common sight on our roads, often conveying a solitary officer, an orderly usually occupying the driver's seat? It is by such common-sense methods that petrol supplies may be conserved and war expenses kept in check.

RECENT IMPROVEMENTS IN THE SPRING FRAME DOUGLAS.

WE referred in our last issue to the improvement in the anchorage of the rear springs in the spring frame Douglas. This is accomplished by allowing a certain amount of motion to the laminated springs at the bracket, which is compensated at the forward anchorage by the ends of the springs being allowed to slide slightly while the anchorage itself oscillates.

The wooden footboards have now been replaced by others of cast aluminium, pivoted in the rear and spring-supported at the forward ends, which are turned up to a small extent and serve to keep mud from the boots. The carrier, as can be seen in our illustrations published last week, is sprung with the machine, but at the same time it is not unduly high.





The sidecar has four separate points of attachment. At the rear of the body is a receptacle for tools and spares, as shown in the sketch.

TIMES TO LIGHT LAMPS.

GREENWICH TIME.

Apl. 5th ... ... 7.6 p.m.
,, 7th ... ... 7.9 ,,

SUMMER TIME.

Apl. 9th ... ... 8.13 p.m.
,, 11th ... ... 8.16 ,,

Motor Traders' Association.

Mr. Arthur Goodwin, of C. A. Vandervell and Co., has been elected for a second term of office as president of the Motor Traders' Association.

This Week's Map.

In our last Overseas section we published a map indicating the possibilities of the motor cycle in the Old World, and this week we give the New World. It is difficult to decide which is the more interesting. Each is worth a good deal of pondering over, and undoubtedly these maps will prove of special interest to those adventurous spirits who, after the war, intend to seek their fortunes outside the British Isles.

One Thousand Gallons Missing!

At West London recently H. A. Waters, taxi driver, F. S. Bennett, Cpl., A.S.C., and another taxi driver, Frank Fraser, were charged with being concerned in stealing ten gallons of petrol in two-gallon cans from the A.S.C. Depot, Hammersmith. Detective-Sergeant Tirchener said that complaint had been made that 1,000 gallons of petrol had been missing from the depot, and a remand on bail was ordered.

Airmen of To-day.

From the trend of aeroplane invention we are learning much as regards valves, cylinders, lubrication, and general efficiency. Some day we may have sidecars with frames on aeroplane lines—light, supple, yet strong. It is well to remember that the majority of the men who are to-day risking their lives in aeroplanes over the enemy's lines acquired their love of mechanics from the motor cycle. Our airmen of to-day are the motor cyclists of yesterday, and thus the motor cycle and the aeroplane move on together.

White Paper.

It will have been noticed that the colour of the paper on which *The Motor Cycle* is printed is not nearly so white as formerly, and there is every likelihood that the standard of whiteness will be reduced still further. The appeal of the Ministry of Munitions to buyers to use paper of lower shades is because one of the ingredients used for whitening paper is needed for Government use. In consequence, it is likely that less will be available in the manufacture of paper.

Features of this Issue.

Many exclusive features are embodied in the present issue of *The Motor Cycle*, not the least interesting, perhaps, being the first details of a number of makes of motor cycles for the Russian Army. Overseas readers in particular will read the descriptions with avidity, since the machines are built to a specification drawn up in a country where good roads do not exist.

Easter and Motor Cycling.

The general public are urged by the Board of Trade to avoid railway travelling during the Easter holidays. The train services have been greatly reduced in comparison with previous years, so lucky is the man who possesses an economical motor cycle.

Scope of Operations Extended.

Recently, in the Chancery Division, Mr. Justice Sangant made an order confirming the alteration in the memorandum of association of the New Rover Cycle Co., Ltd., Coventry, which would enable them to carry on business as makers of motor cycles, in addition to ordinary cycles.

Counsel said the memorandum restricted their business to the latter, but the alteration was desired because they had acquired the motor cycle business of another firm.

The Arbuthnot Trophy.

Our announcement of the presentation of the above by Mr. E. M. P. Boileau, although made on behalf of the Auto Cycle Union, as stated, may have conveyed the impression that *The Motor Cycle* was in a special degree responsible for the presentation of the trophy; but we have no desire to take special credit. The trophy was subscribed for by members of the Auto Cycle Union and other friends of the late Rear-Admiral Sir Robert K. Arbuthnot, and Mr. Boileau undertook the presentation at the request of the Secretary of the A.C.U. and as representing that body.

Dublin Club's Meeting.

At the annual general meeting of the Dublin and District Motor Cycle Club held last week it was agreed, in view of the fact that the customary activities of the club were for the moment in abeyance, to suspend payment of subscriptions for the current year. It was also agreed that holders of the club's trophies that had not been won outright should be retained by their present holders until such time as competitions were resumed. The statement of accounts presented disclosed a net balance of £5, after payment of outstanding liabilities. Last year's officers were re-elected *en bloc*.

SPECIAL FEATURES.

ILLUSTRATED DESCRIPTIONS OF OVERSEAS MODELS.

RETROSPECTS OF A RURAL RIDER.

A MILLION POUND OVERSEAS TRADE.

Average Prices.

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the figures for the preceding five weeks. Thus the general trend of the market is visible at a glance, though many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average.

Make.	Year.	H.P.	Average for last week.	Latest weekly average obtainable.
A.J.S.	1916	6 combination	£95	£96
,,	1914	6 combination	—	£56
,,	1916	4 combination	—	£90
Allon	1916	2¾ 3-speed	—	£33
,,	1915	2¾ 2-speed	£26	£26
Ariel	1915	3½ 3-speed	£45	—
,,	1914	5-6 sidecar	—	£55
,,	1913	3½ 3-speed	—	£30
Bat	1914	6 3-sp. sidecar	£47	£46
Bradbury	1913	4 2-sp. sidecar	£32	—
,,	1914	4 2-sp. sidecar	—	£44
Brough	1915	3½ 2-speed	£52	£52
B.S.A.	1916	4½ Model K, s-car.	£58	£65
,,	1915	4½ Model K, s-car.	£50	£57
Caltborpe	1915	2¾ 2-speed	—	£29
,,	1915	2¾ 2-stroke	—	£23
Chater Lea	1913	8 combination	—	£35
Clyno	1915	2¾ 2-stroke	£29	£27
,,	1914	6 combination	—	£65
Douglas	1915	2¾ 2-speed	£48	£45
,,	1914	2¾ 2-speed	£35	—
Enfield	1916	6 combination	£77	£78
,,	1915	6 combination	£68	£68
,,	1916	3 2-speed	£45	£45
,,	1915	3 2-speed	£35	£35
H.-Davidson	1916	7 combination	—	£80
,,	1915	7 combination	£68	£69
Henderson	1916	7 combination	£100	—
Humber	1915	6 combination	—	£65
,,	1914	3½ sidecar	£35	£35
Indian	1916	5 combination	£67	£65
,,	1915	5 combination	£48	£45
,,	1916	7-9 combination	£90	£90
,,	1915	7-9 combination	—	£70
James	1916	4¼ combination	£75	£72
,,	1916	2-sp., 2-stroke	—	£30
Levis	1916	2¾ Popular	£23	£25
,,	1915	2¾ Popular	—	£22
Matchless	1915	7 combination	—	£75
New Hudson	1916	2-sp., 2-stroke	£25	£30
,,	1915	4 combination	£50	£45
Norton	1916	3½ 2-speed	£47	£47
,,	1915	3½ T.T.	£32	—
P. & M.	1915	3½ combination	—	£65
,,	1914	3½ combination	—	£55
Premier	1915	2½ 3-speed	—	£28
,,	1914	3½ 3-speed	£48	£43
Rover	1916	3½ T.T.	£48	£48
,,	1915	3½ T.T.	£40	£40
Royal Ruby	1916	2¾ 2-stroke	£30	—
Rudge	1915	3½ Multi	£45	—
,,	1915	3½ Multi, sidecar	£45	£45
Scott	1916	3¼ combination	—	£60
,,	1915	3¼ combination	£55	£50
Sunbeam	1916	8 combination	—	£110
,,	1916	3½ solo	£75	£70
,,	1915	3½ combination	—	£73
Triumph	1916	2-stroke	£39	—
,,	1915	4 countershaft	—	£50
Zenith	1915	8 Gradua gear	£58	£65

Crowded Out.

The Critics are still active, though they have been crowded out of this week's issue by the number of exclusive features of a more topical nature.

Mounts for the R.F.C.

The R.F.C. are now taking other machines in addition to the P. and M., which has rendered magnificent service hitherto. It must not be thought, however, that the number of P. and M.'s supplied to the R.F.C. is to be in any way reduced.

Chain Drive.

"Auriga" informs us that he is happy to note that "Ixion" has modified his views somewhat with regard to all chain drive. He considers that few machines can compare with the all chain 3 h.p. twin Enfield for sweetness in transmission.

American Machines.

The power units of some of the new American two-strokes are admittedly neat. The system of casting the gear box in unit with the engine base, so popular in the States, is rather taking, and another good feature is the low speed chain drive.

Magneto Drives.

Long chain magneto drives are undoubtedly a mistake, as they tend considerably towards fluctuations in the timing. The drive should be as short and rigid as possible for regular, no trouble timing. It is quite conceivable, moreover, that a weight of chain throws undue wear and strain upon the magneto bearings.

R.F.C. Officers and their Tunics.

A week ago we referred to an Army instruction calling upon officers of the Royal Flying Corps to wear the double-breasted coat and usual R.F.C. tunic. This Order, we learn, has now been cancelled until further notice, those officers who had the field service tunic protesting that the Order entailed needless expense.

Which Type of Clutch?

A few of the Sunbeam machines supplied to private riders since the outbreak of war have been fitted with dry-plate inset clutches. This was merely owing to a shortage of phosphor-bronze, and though these clutches have proved excellent in every respect, the Sunbeam manager still leans toward the standard pattern—phosphor-bronze to steel multi-wet-plate.

A Windfall for Clare.

Under the above heading *The Irish Cyclist and Motor Cyclist* reports: "A very large quantity of petrol was recently washed ashore on the Co. Clare coast, and was sold by the authorities to a local merchant at about 8d. per gallon. In view of the present price of petrol, it seems rather an extraordinary thing that it should have been given away at this remarkable figure."

If contained in cans, which have been afloat for some little time and subjected to varying temperatures, the local merchant may discover on opening them that they contain quite a high percentage of salt water, which may necessitate selling the stock as a "heavy fuel."

The National War Funds.

The Prince of Wales's Fund (distributed £3,564,508)	£6,047,975	0	0
British Red Cross Fund	6,416,326	10	0
Tobacco Fund	127,611	0	0

A Questionable Boost.

A U.S.A. engineering contemporary, in a paragraph "boosting" a new lubricant, states that the car on which the trial was made was driven fully out for two hours, and the patent lubricant "didn't do the engine any harm."

Gas Lighting.

The coming of the tail lamp dealt a severe blow to gas lighting. When we had only one light to feed, the gas generator was tolerably satisfactory, but the necessity for complicated tubing has all but served the old and well tried system with its death warrant. "Convert the flywheel into a dynamo" is the common cry of the day.

Magnetic Transmissions.

A well-known journalist-engineer informs us that he has recently been studying the question of magnetic transmissions for motor cycles, but he concludes that all present systems involve too much weight to offer the least degree of promise. Certainly the present-day gear box and clutch will be hard to rival for cheapness, lightness, efficiency and economy.

Another Satisfied Colonial.

Mr. H. B. Morcom, of Pietermaritzburg, S. Africa, has been singularly successful in local competitions with his A.B.C. motor cycle, and writes in glowing terms of its reliability, speed, and general satisfaction. A photograph we have by us shows three silver cups, four gold medals, and four certificates won by Mr. Morcom with this mount, the cups and medals being first prizes in respect to eleven different events, open to South Africa. The four certificates were awarded by the Pietermaritzburg Club, the value of the prizes having been given to the War Relief Funds.

Mr. Morcom writes that he is anxious to try one of the latest model A.B.C.'s, though he admits that his present machine is going as well as ever.

Fixed Petrol Prices.

There is a possibility that the prices of petrol may be fixed by the Government in the near future—a matter which concerns only a fortunate few.

Air Leaks.

Soap, we are informed, is excellent for stopping air leakage between the carburetter and the induction pipe, as, while fulfilling its purpose, it does not cause difficulty in withdrawing the carburetter. From the looks of one or two motor cyclists we see about Coventry, we would suggest that the same substance might advantageously be used for a more usual purpose.

Overcoming Fuel Scarcity.

An African gentleman (possibly a nigger) sends us his design for an air-propelled motor cycle, his ideal being, apparently, a converted Triumph. The oil pump is made into an air pump for obtaining pressure in the tank. The engine is started on this pressure, and keeps itself going by returning a volume of air (equivalent to the amount it uses) from the underside of the piston (*i.e.*, the crank case), occasional application of the hand pump making up any deficiency caused by leakage. We would suggest that a fan on the handle-bars to cool the brow of our tropical correspondent would be more in line with his requirements.

Springing.

As regards spring frames, Mr. Alfred Scott, the ingenious inventor, pins his faith in coil springs, claiming as their distinctive merits cheapness, lightness, and quick adaptability, *i.e.*, the springs can quickly be changed to accommodate the weight of the rider. But, as "Ixion" points out, coil springs are extremely quick in action as compared with leaf springs, owing to their lack of internal friction, and therefore the coil spring, to impart that steady floating motion peculiar to the leaf spring, would necessitate a friction shock absorber working in conjunction. Car owners familiar with such shock absorbers as the Derijohn will realise the immense desirability of friction in the working of a springing system.

THE A.C.U. ANNUAL GENERAL MEETING.

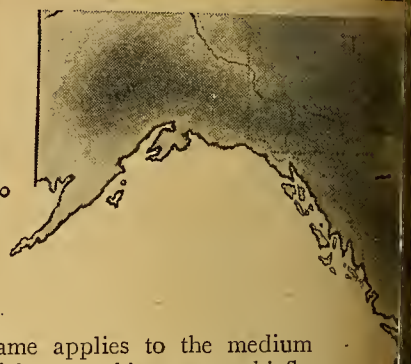
THE annual general meeting of the Auto Cycle Union was held at the Royal Automobile Club on Thursday evening, March 29th, when there were present Mr. Otto Thomas (chairman of the Union), supported by the Rev. E. P. Greenhill and Mr. H. P. E. Harding (vice-chairmen), Mr. A. W. Torkington (hon. treasurer), and a number of members of the Union.

The Hon. Arthur Stanley, M.V.O., C.B., M.P., was unanimously re-elected president of the Union, and the following gentlemen were elected vice-presidents: Professor C. V. Boys, F.R.S., Mr. S. F. Edge, Col. Sir H. C. L. Holden, K.C.B., F.R.S., Mr. A. J. Wilson, Lt.-Col. A. E. Davidson, D.S.O., and Lt.-Col. D. F. Nicholl, D.S.O. The last two officers were elected, not only in recognition of the important work they have done in the past in connection with the movement, but as a tribute to the valuable services that motor cyclists, as such, are rendering to their country at the Front.

The annual report and balance-sheet for the year 1916, as adopted by the committee and published, was formally presented to the meeting. This concluded the business on the agenda.

A suggestion was then put forward by Mr. F. L. Goodacre that a special sub-committee should be formed to prepare the ground for a vigorous campaign to further the interests of motor cycling in general, and of the A.C.U. in particular, immediately after the war, and this was warmly supported. Subject to the formal approval of the General Committee, the following gentlemen agreed to serve on such a committee: The Rev. E. P. Greenhill (chairman), Messrs. W. H. Wells, W. Cooper, F. L. Goodacre, and E. M. P. Boileau. A vote of thanks to the chairman concluded the meeting.

RIDING CONDITIONS OF THE WESTERN HEMISPHERE.



An Instructive Guide to the Road and Climatic Conditions, of Value to Manufacturers and Motor Cyclists alike.

IN our last Overseas section we published a map showing approximately the conditions that prevail throughout the Eastern Hemisphere as regards the use of motor cycles, and this succeeding map, showing on the same lines the Western Hemisphere, now completes the motor cyclist's atlas of the world. These maps may appear to emphasise the vastness of the earth's unsettled areas, but we have only to compare the extent of the areas indicated as rideable by the light shading with our own small islands in order to appreciate the immensity of the world's Overseas markets.

British-made motor cycles are supreme the world over. It was Britishers who developed and perfected the motor cycle in 1903-9, and who set the fashion to the world. At the present time, owing to restricted output due to the war, home-produced motor cycles are commanding fabulous prices in countries Overseas, premiums being offered in almost every case. Seldom a motor cycle can be found in a showroom, eager buyers snapping up the machines immediately on arrival. The supremacy of British motor cycles must be maintained after the war, and on account of the excellent name held by English-made motor cycles in the matters of finish, efficiency, and longevity, the markets are full of eager buyers. To satisfy the demand outputs must be increased, desirable features of an Overseas mount introduced, and an improved system of distribution arranged, otherwise cute American manufacturers will extend the strong hold they have already made in countries where British motor cycles have hitherto predominated.

HOW TO READ THE MAP.

On a map of such small scale isolated roads and settlements cannot, of course, be shown. The mountain ranges are indicated in black shading, but it must not be taken that the whole of the black areas are necessarily unrideable. Across the Rocky Mountains, for instance, there is more than one possible way, while in British Columbia scores of prosperous mining camps and apple producing areas lie by the lakes and rivers, many good roads where motor cycles are successfully used, following the course of the waterways.

The same applies to the medium tint, which, on this map, chiefly indicates uncleared forest. Through some of these forests roads extend for immense distances—roads which to-day carry their motor traffic—though such arteries from one centre of civilisation to another cannot be shown.

The settled areas, where motor cycles are at present in successful use, are indicated by the light shading. This is the market of to-day offering its immense chances of trade development.

In order to follow the map one has merel read the figuring and lettering nearest to selected area then refer to the tabulated lists be

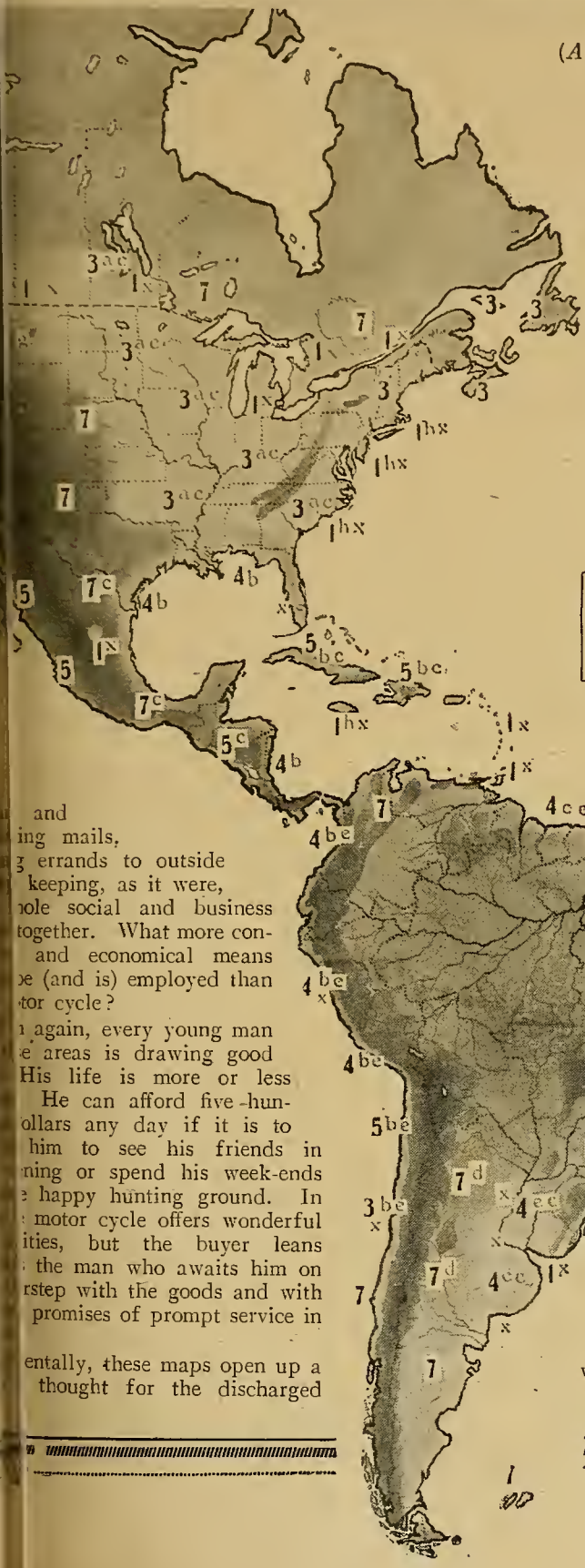
GENERAL NATURE OF THE COUNTRY.

1. Conditions similar to the British Isles.
2. Flat country. Pot-holes.
3. Clay or mud. Riding conditions moderate weather, but bad during rainy season.
4. Deep sand or dust the general order.
5. Rocky country. Water-splashes numerous. S ruts.
6. Tropical to semi-temperate. Monsoons. Roa but are generally narrow and dusty. By-roa
7. Chiefly bush or desert tracks. Limited riding

THE OPPORTUNITIES FOR TH MOTOR CYCLE.

Truly has it been said that to-day the motor is the forerunner of the railway, an ticularly is this so in the pioneer regions New World, where every infant mining cam prospect, every prairie ranch and forest camp, is dependent upon its own means of portation. In the forest regions of the nor south the petrol launch is to the pioneer wh camel is to the Arab. Every outlying cam settlement has its fleet of launches on whic dependent for food, mails, cut timber, machinery, but as settlement becomes an plished fact water transportation is rapidly seded by road transportation.

Then it is that the motor cycle beco necessity. Every camp of importance h messengers, whose work it is to live on the



(A Map of the Eastern Hemisphere appeared in "The Motor Cycle" of March 1st, 1917.)

and
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together. What more con-
and economical means
ɔe (and is) employed than
tor cycle?
ı again, every young man
e areas is drawing good
His life is more or less
He can afford five-hun-
ollars any day if it is to
him to see his friends in
ning or spend his week-ends
e happy hunting ground. In
motor cycle offers wonderful
ities, but the buyer leans
the man who awaits him on
rstep with the goods and with
promises of prompt service in

entally, these maps open up a
thought for the discharged soldier of to-morrow. Europe and the British Isles may be replete with practical motor engineers, but not so the more distant quarters of the globe. Canada before the war was suffering from a dearth of practical men for her motor boats, motor driven agricultural appliances, and motor cycles, the pay varying from 10s. to 18s. per day in proportion to the responsibility and the expense of living, and the ever widening field is not likely to become overstocked. It is a free, manly life, calling for men of the right colour—men who are prepared to do a man's share in a country for men, a land of widening promise.

A WORD TO THE OVERSEAS MOTOR CYCLIST.

In another part of this issue we quote an Australian view of the enormous development of American external trade since 1914. It is to be hoped, now that Britain's hands are tied, that every son of the British Empire will contemplate this gigantic problem in an equal spirit of true patriotism. Though there is perforce little or no activity so far as private orders are concerned, British manufacturers are alive to the needs of the Overseas rider, and behind the scenes plans are maturing for an energetic after-war programme.

POINTS TO CONSIDER IN DESIGN.

a. Deep mud. Ample mudguard clearance.
b. Tropical. All black finish. Coachbuilt sidecars not satisfactory. Rubber goods apt to perish.
c. Rough country. Ample power. Good ground clearance. High magneto position. Positive drive. Spring frames or spring seat-pillars preferable. Strong sidecar frames and attachments. Strong rims and spokes.
d. Thinly populated. Large tanks needed. Full equipment of spares and tools.
e. Dust. Large tyres and wheels. Air intake preferably arranged with extension.
g. Adjustable air supply to suit greatly varying altitudes.
h. Roads good to moderate round coast.
x. Lightweight machines suitable for use—probably about cities.
w. Where motor cycles have been successfully used for military purposes.

AMERICAN INVASION OF AUSTRALIA.

Some Startling Facts on the Growth of American Trade.

UNDER date January 6th the *Melbourne Argus* contains a striking article illustrating the extent to which American trade has taken possession of the Australian markets since the outbreak of war. In order to convey an accurate idea as to the condition of things we cannot do better than quote from our Australian contemporary, setting forth the figures there given.

Soon after the outbreak of war "Americans awoke to the golden opportunity for trade domination which the pre-occupation of Europe presented. . . . Among other schemes for expansion was the creation of the American International Corporation, which has a capital of £10,000,000, and is under the direct observation of the Rockefeller group of banks. The object of this institution is to enable long credit to be given to foreign customers for American goods, the nature of such business being beyond the scope of the ordinary banking system. In every quarter of the world the American exporter has been successful to an extent far beyond his anticipations, and to-day, notwithstanding preferential tariffs, occupies a very important position in the external trade of the British Dominions."

There is practically no branch of commerce, says the *Argus*, into which American goods have not penetrated into Australia, while the persistent undercutting of prices and the absence of competition has placed American goods in a premier position throughout the Commonwealth. An estimate as to the growth of American trade in Australia can be obtained from the following imports of merchandise:

Imports from the United States.

JANUARY TO DECEMBER.	
1910	£7,659,150
1911	9,007,657
1912	10,764,257
1913	10,908,653
JULY TO JUNE.	
1914-15	10,871,298
1915-16	15,864,516

These figures have caused some concern in financial circles; Australia is buying American merchandise by the shipload, while the Commonwealth treasury is clamouring for money to carry on the war.

A Brighter Outlook.

The *Argus* considers, however, that America will lose her grip of Australian trade immediately competition is resumed. This statement is based on the assertion that American manufacturers and export agents have, in some cases, failed to deliver goods equal to sample, while in one section of trade at least the contract has not been observed. In the present state of American affluence the "take it or leave it" attitude may have been successful, but the American traveller will have much to overcome when he calls in more peaceful times.

Some Telling Figures.

Still the condition of things is, at the present time, grave, and, having dealt with the position as a whole, the *Argus* touches briefly upon some of the chief American conquests. "Being the most conspicuous item, motor cars and their requisites may be first considered. As soon as the British and Continental factories were confined to war work, the American motor car makers literally flooded Australia. In the year ending June 30th there were over £1,000,000 worth of cars and cycles brought into Australia. The aggregate is about two and a half times the normal figure. Of motor cycles, the figures show £105,461 worth as compared with £6,088 for the calendar year 1913. Of motor car chassis, bodies, etc., the combined value was £986,021, against £430,216."

Thus it will be noted that there were over a million pounds worth of cars and motor cycles sent to Australia in the year ended June 30th—two and a half times the normal figure—and whereas motor bodies and chassis have been multiplied by a little over two, motor cycle imports have been multiplied rather over seventeen times!

WHY STRANGLE HOME FUEL PRODUCTION?

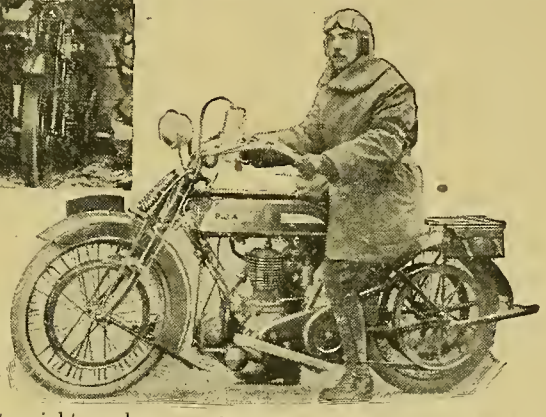
DEALERS very much resent the Government's action in including home-produced fuels in its embargo upon petrol substitutes. It is not so much the fact of the sale of the fuel being prevented as it is the bad effect it has upon the sale of the economical forms of motor vehicles, which are the only type now having any real sale. If the ban continues on these home-produced fuels, not only will harm be done to the trader, but new industries which are in course of construction will be strangled at their birth, and this without the slightest good being done in assisting the Petrol Control Committee in its desire to conserve petrol supplies. It has been abundantly proved since the war began that we have placed too much reliance upon imported commodities, which, with proper encouragement and support, could have been obtained in this country. Motor fuel is one of them, and surely it would be the height of folly to do anything but encourage the production of home-produced fuel, much less place obstacles in the way of enterprising people who are now attempting to solve the nation's difficulties.

ROYAL OVERSEAS OFFICERS' CLUB.

WE are informed that the Overseas Officers' Club (formerly R.A.C.) has not been used to the extent hopefully anticipated—a fact probably due to the small number of Overseas officers home on leave. The committee is working in a manner which should win for the Club the highest recognition, while the Hospitality Committee is providing entertainments which should be thoroughly appreciated. We have no doubt whatever that the magnificent premises will be used to greater effect when the leave season begins again.

MILITARY NOTES.

NEWS OF MOTOR CYCLISTS FROM FAR AND NEAR.



FRENCH DESPATCH RIDERS.

The B.S.A. is a favourite mount in the French Army, as revealed by the above group of D.R.'s. Note the various types of head gear. Photographs received from a French reader, André Moulinie, who is shown in the lower photograph. M. Moulinie is attached to a French Artillery Brigade.

MOTOR CYCLISTS OF A FRENCH ARTILLERY BRIGADE.

AMONG our correspondence from military readers are many communications from allied motor cyclists. One such received last week from a French artillery brigade motor cyclist, André Moulinie, says :

"Being a reader of your interesting paper since my first journey to England before the war, I suppose you will be pleased to know that I have been at the Front since 1915, but am now a despatch rider with our heavy artillery. I have five D.R.'s under my command, and we are all mounted on English motor cycles.

"We are delighted with our mounts (they are 3½ h.p. B.S.A. with three-speed gear), and their smoothness of running and accessibility of all parts. We have sidecars, as solo riding is far more dangerous owing to night work on the badly cut up roads. Sometimes we have to ride between two ranges of lorries and cars of all sorts.

"Nearly all French despatch riders are now mounted on Triumphs or B.S.A.'s."

A FAMILY'S EXCEPTIONALLY GOOD RECORD.

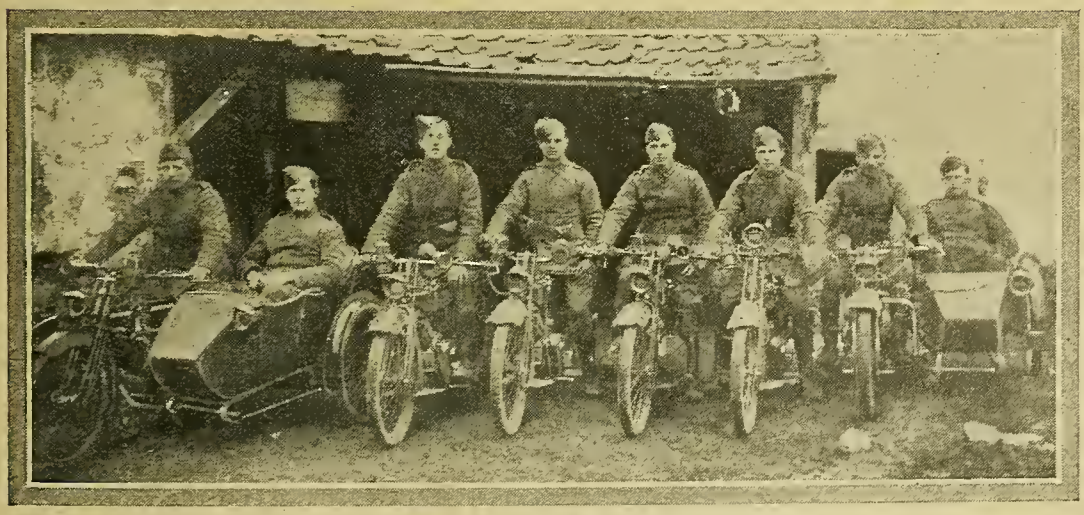
CHIEF MOTOR MECHANIC G. BELL, of the Motor Boat Patrol, who was formerly in the employ of the New Hudson Cycle Co., Ltd., and successfully drove a Harley-Davidson sidecar in the Birmingham Club's Easter Trial of 1916, belongs to a fighting family. He has a brother attached to the Canadian Forces, now in a London hospital suffering from shell shock. Another brother who was with the New Hudson Cycle Co., of Birmingham, is now driving a "Tank," whilst his youngest brother but one has recently been wounded, and is now lying in Netley Hospital. Still another brother (his eldest) is at the Coventry Ordnance Works, where he has been employed for years.

COLLEAGUES IN THE FLYING CORPS.

WE are pleased to be able to record recent promotions of former members of *The Motor Cycle* editorial staff in the Royal Flying Corps. H. D. Teage is now a captain, whilst the *Gazette* last week recorded the promotion of Maurice Sampson to lieutenant and second-class equipment officer. Sec.-Lt. B. Alan Hill, a third member of the staff in the R.F.C., is at Reading.

R.F.C. MOTOR CYCLISTS ON THE SOMME.

FROM Cpl. S. L. Walker, of the Royal Flying Corps, we have received a photograph of a group of motor cyclists in his charge. They are (or were at the time of writing) at work in the Somme area. Cpl. Walker says, "Some readers of your paper (which we read with interest) will no doubt be able to recognise some of the figures as former motor cyclists of peace times, and now doing their bit out here. You may remember me as a Rudge rider from Huddersfield some three or four years ago. Things over here are not like they are in 'Blighty,' among them the roads. The present surfaces in France remind me of the time when the Huddersfield A.C.C. used to go looking for freak hills.



R.F.C. motor cyclists, riders of P. & M.'s, in the Somme area.

THE LIFE OF A WAR MODEL MOTOR CYCLE.

AT the commencement of the war many wild estimates were made as to the average life of the motor cycle on Active Service. Since then, however, reliable records kept by expert men have been available for readers, and it has been proved that the life of the motor cycle on Active Service is a long one despite its daily usage under the most difficult conditions. We have received from Pte. J. W. Sheard, M.T., A.S.C., an account of repairs done to his Triumph during nine months of strenuous work in all weathers and on all roads. The items are taken from his log book, which is filled up and signed each time a repair is performed. They are as follow :

2/ 8/16.	Broken head spring.
7/10/16.	Broken clutch control wire.
20/11/16.	Broken footrest (due to skids).
7/12/16.	Broken footrest.
24/ 1/17.	Broken ratchet spring in quadrant.
4/ 2/17.	Broken throttle Bowden wire.
15/ 2/17.	New cones and balls in back wheel.

The machine was in the repair shop no longer than one and a half hours each time at the most. The engine still has the original valves and Lodge weather-proof plug. The magneto (M.L.) has never been touched; it has a rubber cover, and Pte. Sheard has never been troubled with water causing a "short." The same Triumph belt and Forward fasteners are still in use.

VACANCIES FOR DESPATCH RIDERS.

THERE are now vacancies for motor cyclists in the Royal Engineers' Signal Service. Many enquiries have reached us from readers anxious to join this section of the Forces, and the news will be welcomed. Men required for despatch riders must be of medical category A and at least eighteen years and eight months of age. Men are enlisted as pioneers, and on passing the course are promoted corporal with pay at 2s. 6d. per diem. Motor cyclist artificers receive 3s. per diem.

Applications should be made to the Commandant, R.E. Signal Service Training Centre, Woburn, Beds.

A DESPATCH RIDER IN EGYPT.

Experiences in a Temperature of 120° in the Shade.

How a Motor Cycle engined Trolley beat the Train.

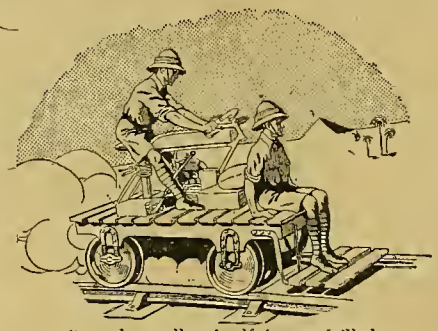
WE had been training hard for three months when news came that we were on draft for the Mediterranean. After this news very little was done for a month except parading with full equipment, and we had almost given up hope of ever embarking when on a day in early March one of the draft came bounding into the hut and said, "Boys, we're off at four!" As rumours were always flying about no one would believe him, and he was greeted with the usual rejoinders. However, it proved to be quite correct, and we were told to parade in half an hour with machines ready for the road. There was some hustle during those thirty minutes, and eventually we were all lined up. We were given final instructions, ammunition, etc., and last of all a sheet, foolscap size, entitled "How to Prevent Frostbite"—a suggestive pamphlet considering that six inches of snow lay on the ground. But we did not anticipate much frost in the part of the Mediterranean for which we were bound.

We arrived in Alexandria after a nine days' voyage, with the usual exciting incidents from days of rough weather, and our thoughts always wandering to our bicycles rolling about in the hold—as we thought. However, when we had them taken ashore we found the only damage sustained was a Duggie float chamber knocked off.

120° in the Shade.

A few of us were attached to Signals in Alexandria for about five weeks, the work here being very interesting and the roads exceptionally good, except for one stretch of very rough *pavé* of about four miles, over which a lot of our work took us. We worked there for about three months, and up till then I was riding my original Douglas, which never let me down once. I was properly attached to this machine, but we were doomed to be parted, for I got an order to report for duty at a place about three hundred miles away.

This brought me into the warmest part of Egypt, and it was no joke working in a temperature of 120° in the shade. My work took me over treacherously muddy



"— the trolley itself is no drilled out racing chassis, I can tell you."—Cpl. BOWIE.

roads and very loose deep sand when journeys had to be made into the desert. My stay there was not of long duration, and presently I had to "hit the trail" for the desert proper. I was to be

Cpl. M. P. Bowie, a despatch rider attached to a R.E. signal section, describes his experiences in Egypt. The machine is a 2¾ h.p. Douglas.

stationed right in the middle of Nowhere, about 550 miles from the base from which I started. I had a Triumph here, and felt the benefit of the clutch, kick-starter, and three gears, as the country over which we were travelling was exceedingly rough and very hilly in places.

Beating the Train.

During my stay up there I was for some time on the motor trolley illustrated in *The Motor Cycle* of January 11th, 1917. After making some alterations to this, principally the fitting of ball bearings to the wheels, and improvising a band brake, I made some quite good running times on it. Three of us made the journey of 108 miles across the desert in under five hours, and so beat the train time by two hours. Twenty miles an hour does not seem such a great average on rails, but when one comes to think of the conditions under which we were travelling it was really good going. We were three up, spares, petrol, equipment, rations, etc., aud the trolley itself is no drilled out racing chassis, I can tell you. It is just as much as four men can do to lift it off the rails. Considering all those factors, I think the 4 h.p. Triumph engine did wonderfully well.

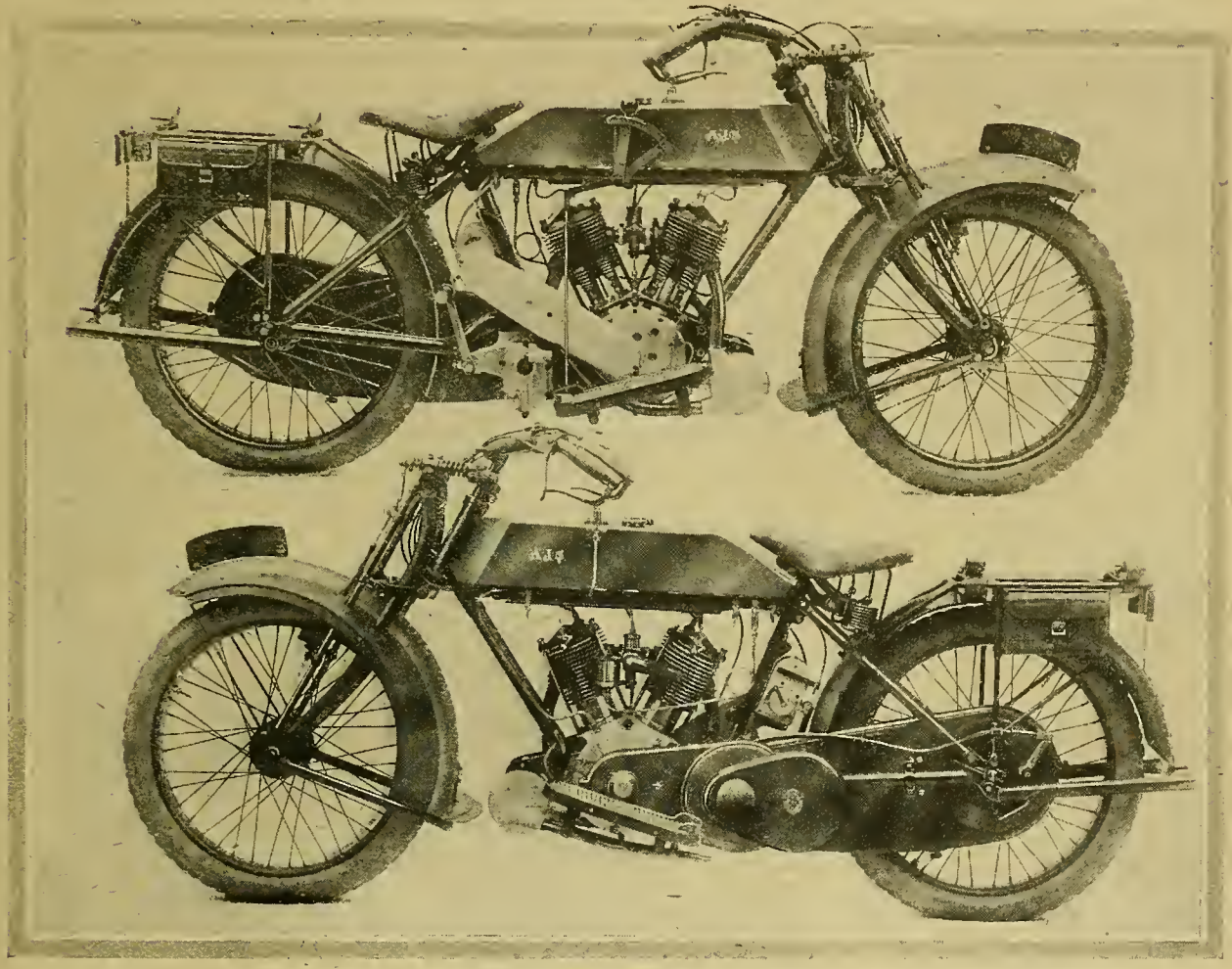
A Deluge.

The work I was on up there (in connection with the occupation of an oasis) being completed, I came back to a "lines of communication" signal office in a small town. We had a two days' storm here recently which washed the "roads" away, so to speak. Never in all my travels had I seen such mud, and I have yet to find the tyre which is non-skid in it. In less than half a mile your front wheel stopped, clogged up with the mud, and it is then you begin to think that there is really something in the plea for greater mudguard clearance. The riding conditions were so bad that the Brigade D.R.'s did not use their bicycles, but enjoyed the "luxury" of a Ford, but we R.E. D.R.'s had to stick it, there being no alternative, and so we kept up the reputation of the "Houghton Regis Mud Pluggers."

M. P. BOWIE,
R.E. Signal Squad, E.E.F.

A.J.S. FOR MILITARY WORK.

The Special Design of 6 h.p. Mount with 28″×3″ Tyres for Solo Work in Russia.



A TWIN A.J.S. FOR THE ALLIES.

A specimen of the 6 h.p. three-speed A.J.S. machine, a large number of which are being supplied to the order of the Ministry of Munitions for the Russian Army.

AMONG firms favoured with orders for the hundreds of British-made bicycles now being produced in this country for the Russian Army are the manufacturers of the A.J.S. This make of motor cycle has not hitherto been used extensively in war work, but it has many strong claims for consideration, its record for reliability and speed being well-known. We illustrate a specimen of the machine intended for the Russian Army, and it will be noticed that there are quite a number of departures from the standard specification. The model is the 6 h.p. twin (74×87 mm.), and by reason of the difficult conditions under which the machines will be used, the Russian Government stipulate certain features, including a 6in. ground clearance. Again, the magneto must not be placed in close proximity to the exhaust arrangements, which requirement has necessitated the A.J.S. transferring the magneto to a position at the back of the seat tube, where it should be well protected from mud or foreign matter, though a long chain drive is the result. The frame has a horizontal top tube, whereas the standard A.J.S. slopes rearwards. In most details the standard type conforms to the special requirements of the Russian Government. One of these, which will particularly appeal to Overseas riders, is the demand for oil bath chain cases. The 6 h.p. machine illustrated will not be used as a sidecar mount as many may have imagined. The Russian authorities stipulate 650 c.c. as the minimum capacity for solo machines and an engine in the neighbourhood of 1,000 c.c. for sidecar work, which will alone serve to show the extremely difficult conditions under which the machines will be used. The magneto, by the way, is a Thomson-Bennett, and the plugs Sphinx, so that the whole of the machine is British made in every part.

The tyres fitted to this machine are 700×80 mm. light car pattern Dunlops.

Since the first military A.J.S. was produced, both the handle-bars and seating arrangements have been slightly lowered, giving the machine a symmetrical appearance, which will be appreciated by reference to the accompanying illustrations.

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

THE SPRING FRAME PROBLEM.

Sir,—We have read "The Critics" in your issue of March 22nd, and regarding cornering at speed, as manufacturers of the Edmund motor cycle, we would like to point out that our 1917 model is fitted with footboards which allow ample clearance to corner at any speed without the possibility of the inside footboard hitting the ground.

In our system of springing, the rider is entirely insulated from both road shock and engine vibration without any sacrifice as regards lateral rigidity.

The simple method employed in spring adjustment in order to accommodate riders from 8 to 16 stone in weight is also a huge advantage. C. EDMUND AND CO., LTD.

OVERHAULING AN ENGINE-SHAFT GEAR.

Sir,—I should like to submit the following (with your permission) as the easiest way of replacing the spring in an N.S.U. gear: Procure a ⅜in. bolt (with large head), 6in. long, threaded for 3in., and nut to fit, also a washer ⅛in. less in diameter than washer E in Mr. D. Thomas's sketch (March 15th, page 243), and proceed as follows: Put bolt through gearshaft from behind, place spring in position with washer E, follow by smaller washer, and run on nut, tighten up with spanner, and place holding pins in holes C, release nut gently until washer E grips holding pins, and the job is done.

The above articles cost about fourpence, and can be carried in toolbag. B 525.

Bury.

THE ARBUTHNOT TROPHY.

Sir,—I hope it is not too late to suggest that this beautiful trophy, when it is put up for competition, may be open to Army competitors as well as Naval. A Brooklands race meeting, or a high-efficiency trial on the track, under the ægis of the Auto Cycle Union, would be a fitting commemoration of the sporting Admiral and his fighting death.

B.E.F. A. LINDSAY (CAPT., R.A.M.C.)

[A similar letter was written on a previous occasion by a correspondent. Capt. Lindsay may rest assured that, when the time comes for drawing up the final rules and regulations for the Arbuthnot Trophy, although the competition is primarily intended for officers of the Royal Navy, these suggestions will receive the sympathetic consideration of the Auto Cycle Union Committee.—ED.]

EVIDENTLY A HAY-MOTOR!

Sir,—The phenomenon spoken of under the heading of "Hay Motor" is one that I can clear up for your correspondent, as I have had the experience many times while riding at "forty" in S. Australia (Port Pirie district).

In my case I turned into a side track off the main road, and on each side there was mustard weed growing to a height of 30in., and it was as thick as a wheat crop. When I got well into the track the sharp crackle of the exhaust changed to the sound made when riding through a tunnel, but very much deadened.

This is probably due to the sound vibrations striking the walls of weed, and a very small portion being returned, as an echo, the rest being broken down by the weed.

The loss of power, lag, etc., spoken of is evidently imagination, and the opening of the throttle would certainly give more sound. It is clear to me, because my friend was riding on the main road at the same time and pace. I did not open the throttle, as I realised at once the cause of the phenomenon, and we maintained the same relative positions on the roads, although I rode through two miles of this stuff.

J. FLETCHER, Australian Munitions Chemist.

A CYCLE CAR REDIVIVUS.

Sir,—A strong current of interest circulated within me as I read "Ixion's" paragraph under the above heading in your issue of *The Motor Cycle* of March 22nd, and doubtless, like myself, many "cycle-cum-car" enthusiasts will welcome the fact that the cycle car era is not dead, but merely dormant and even in its infancy.

"Ixion," unfortunately, does not appear to be in a position, at present, even to hint any one feature of the post-war cycle car in question which has come to his knowledge, but, in my opinion, if the Scott Sociable will *not* have a "walk over," good luck to the machine that can "hold the candle" to it for originality, simplicity, stability, accessibility, flexibility, and, last but not least, economy all combined. I beg to add the usual disclaimer. A.A.R.

Fochabers, N.B.

PALMAM QUI MERUIT FERAT.

Sir,—Might I ask your indulgence in bringing to the notice of fellow motorists the courtesy I received from Messrs. Binks, Ltd., the makers of the carburetter bearing that name?

I met with some difficulty in procuring results which these instruments are advertised to give, and communicated with the makers, asking their advice. Several letters passed between us, but (through my inability to understand the instrument) all to no purpose. However, I addressed another letter to Mr. Binks, who very generously offered to loan me two new models to try on my 5-6 h.p. Rudge Multi, without any cost to myself. The first one I tried was successful in every way; even the jets placed in the carburetter, as I had received it, could not be improved upon.

Hence, where I had been running on a consumption of about 40 to the gallon, and poor pulling qualities, I now can get 65 m.p.g., and the machine is full of life. This is with a heavy coachbuilt sidecar and passenger, bad weather, and wretched roads, and in a very hilly part of the country. E. A. TEASDALE.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—I have just been reading a letter from Mr. Gray in issue of March 22nd. In the first place, he states that he is surprised to have his theory of distance judging denied by Lt. Hellier. It might be of interest to some readers if I gave my own experiences of the power of a one-eyed man. I lost my right eye last October in France. For the first two months I was very bad at judging, even short distances. Now, however, this has been overcome, and I can judge any distance.

Now for his second point. He states that if a one-eyed driver at some time had the use of both eyes he would be able to form rough judgments of distances by the apparent size of objects with which he was familiar, and quotes the lamp post, etc. He then states that the one-eyed man would not be able to judge the distance from a motor car or human being, since cars and men vary greatly in size. Let me inform him that I can, with the utmost ease, judge my distance from anything from a G.S. motor lorry to a chicken. Mr. Gray quotes Professor Halliburton, who is writing from theory and not from practice. Since I lost my eye I have not run over anything, and I know that enough chickens to feed the Army have run across my path.

I entirely uphold Lt. Hellier's statements as a brother officer. T. O'C. DOHERTY (SEC.-LT.).

FORCED INDUCTION FOR FLAT TWINS.

Sir,—I have not been able to answer "C.L.V.R. 2872" in your issue of March 15th before, as I have had some difficulty in obtaining a copy of *The Motor Cycle* of that date out here.

I have tried a.i.v. in all positions, with and without the influence of centrifugal force. I find that the centrifugal force in a rotary engine tends to throw the gases outwards from the centre of the axis, so helping to a great extent the initial velocity of induction.

I only mentioned lagging as an expedient where a design had a long exposed induction pipe. The long induction pipe which has no sharp angles, and is well heated, is far better than a short one. But it must be kept hot.

"C.L.V.R.'s" system is very similar to the Aulzer-Diesel principle, which was described in Mr. Schubeler's paper at the Zurich meeting of the Institute of Mechanical Engineers in 1911. In addition, an engine was built by Professor Junkers on the lines of the Oechelhaüser gas engine, with two pistons working in opposite directions. Taking the question of pre-ignition or mechanical pulverisation of vapour gas, owing to high compression, this compression causes the temperature of the gas to rise sufficiently to ignite without the aid of sparking or ignition devices at 200 lb. per square inch in a hot chamber.

Taking the system of alternate firing *v.* double throw crankshaft, the objections are many. In the first place, the cylinders are greatly offset to allow for double throw connection. This means a very wide crank case, not only to compass the crankshaft, but also the main bearings, which would have to be much larger to withstand the twisting and bearing moments.

This not only means a very much larger crank case than in usual practice, but more weight. The other objection is the dead centres occurring at the end of the forward and outward stroke.

"C.L.V.R." should not compare the freedom of piston rings from gumming up with a.i.v. The rings are situated away from the full effect of the explosion, while the piston a.i.v. has the full effect of the heat generated.

The average temperature of the explosion would be 2,500° absolute. If, therefore, there happens to be any oil on the lip of the mushroom valve, this burns immediately, causing the valve to gum. Has "C.L.V.R." ever found a really reliable a.i.v. apart from the piston head a.i.v. that has never gummed up at some time or other?

Yes; I repeat it is impossible to fit a piston head a.i.v. in a very small piston. I cannot see why a small valve is more efficient than a large one. In the former the valve remains open longer to allow the volume to enter. Is that the advantage?

I did not question the fact of 750 c.c. giving more power than 500 c.c., but I wanted to know how "C.L.V.R." got the same power out of an engine of 2¾ h.p. as a standard 3½ h.p. with his system.

B.E.F., France. W. F. MAITLAND EDWARDS.

Sir,—I do not know if your correspondent "C.L.V.R. 2872" is in any way connected with the Flying Services, but I am afraid some of his information is quite incorrect.

He says that "Automatic valves in the piston heads have been proved successful . . ." As a matter of fact, these valves were always the weak point in the engines he refers to, and were continually giving trouble. The chief reason for this was that the piston head is the hottest part in an internal combustion engine, and consequently the inlet valve group got no cooling at all, and was working at practically red heat, the result being that the valves got weak or broke; the valve stem, expanding, used to bind in the guides, or the valve head used to break. Any of these results meant that the flame from the combustion chamber could get to the explosive mixture in the crank case, rendering it liable to ignite, which, in fact, it did do comparatively frequently.

Moreover, the engine did not develop power nearly up to its rating, *e.g.*, the 50 h.p. model—going well—gave about 37 h.p. on the brake; not nearly so good, comparatively, as the modern motor cycle engine.

Also, has he remembered that, as in a rotary, he will have to lubricate with castor oil, which is very expensive, creeps everywhere (the stain cannot be removed from clothes even with petrol), and would leave such an objectionable smell behind it that the police would probably step in and stop the use of it?

The 80 h.p. model was slightly more efficient, developing about 65 to 70 on the brake, but even so I cannot think that the principle would work satisfactorily on a motor cycle engine, especially as this engine would not throttle down—not an inherent defect in rotaries, as I could quote two others which throttle down perfectly. R.F.C.

Bath.

SPARKING PLUG CONDENSATION.

Sir,—The explanation of this is fairly simple. Water forms quite a large proportion of exhaust gas, so that after the engine has cooled out, the contents of the cylinder, whether exhaust gas or air (it may be either or both) must be super-saturated with water vapour.

Water vapour is unable to condense into the minute globules of water, which form what we call a mist, unless there is something present to form a nucleus for each globule. This may be either a particle of atmospheric dust or an electric corpuscle. Apparently the oily walls of a water-cooled cylinder trap the atmospheric dust, and it remains for the discharge of electric corpuscles from the plug electrodes to condense the water vapour, which naturally settles on the nearest convenient object, *i.e.*, the plug.

I should say the cure would be to switch off and crank the engine once or twice to get rid of the water.

P. C. KERSLAKE-SMITH.

Sir,—May I submit the following explanation of the phenomenon you referred to in *The Motor Cycle* for March 22nd under the above heading?

On a cold winter morning the air (particularly that in the cylinders, which contain a quantity of water vapour formed by the combustion of petrol) is often near saturation point. Compression increases the capacity of air for water vapour, so no condensation will occur during the compression stroke. If the engine fires, the temperature is suddenly raised and condensation will not occur, and all will go well. If, however, the engine does not fire on the first pull, then the outward stroke of the piston will cause an expansion of the compressed gases. On expanding, gases absorb heat which is obtained either from the surrounding medium or from the gas itself. In the latter case the temperature of the gas is considerably lowered, and, if in a saturated state when compressed, it is cooled below its dew point, with a consequent deposition of dew. This is what actually happens in the water-cooled cylinders. The cold water jacket prevents heat being obtained externally, and so the gases expand adiabatically, and a film of moisture is deposited on the interior of the cylinder and on the points of the plug. The gap being only 1 mm. wide, the surface tension of the water causes it to collect, and thus bridge the gap and so "drown" the current. In the case of the air-cooled cylinder, the necessary heat is obtained from the surrounding air through the conducting wall of the cylinder, and therefore the temperature is maintained above dew point and no moisture is deposited.

After the plugs have been dried no further deposition of moisture occurs, because the residual saturated gases in the cylinders have by this time been removed. C.W.B.

Waltham Abbey.

SPECIFICATION OF A SIDECAR OUTFIT.

Sir,—With regard to the essential requirements of a really serviceable heavy touring motor cycle and sidecar, I submit the following abridged specification in the hope that some enterprising firm will think such a design worth consideration:

ENGINE.—Flat twin of 750 c.c., outside flywheels, readily detached cylinders, automatic pressure lubrication, exhaust to be practically inaudible.

TRANSMISSION.—Engine to countershaft by enclosed chain on left-hand, countershaft to road wheel, ditto on right-hand of machine.

GEARS.—Four-speed countershaft and plate clutch, with ratios of 4, 6, 9, and 15 to 1.

BRAKES.—Internal expanding in front and back road wheels.

WHEELS.—All quickly interchangeable, including spare, and fitted with 3in. tyres and extra wide mudguards.

FRAME.—Sprung throughout, with five-point attachment for sidecar and outside support to sidecar road wheel.

PETROL CAPACITY.—At least two gallons.

ELECTRIC LIGHTING and road warning as standard

SIDECAR, with hood and windscreen; additional seat let into the side adjacent to the cycle and at right angles to it.
PETROL CARRIER and luggage grid as standard.
FINISH.—Khaki throughout; no plating.
W. A. JACKSON.

AIR V. WATER-COOLING.

Sir,—Mr. Hitchcock's letter in the issue of March 22nd contains many points of interest, but the feasibility of most of them is doubtful.

He asserts that a *properly designed* water-cooled engine is an easy first as a no-trouble machine. Doubtless many motor cyclists agree with him, but does Mr. Hitchcock think that his is the outline of a properly designed water-cooled engine? What are the aims of water-cooling? Two of them are cooler running and less frequent decarbonisations; yet in Mr. Hitchcock's design the one part of the cylinder which becomes hot, and upon which carbon forms—the cylinder head—is actually air-cooled. The detachable cylinder head may solve half the problem of decarbonising, but riders whose engines are so designed know full well the difficulty of retaining a gas-tight joint when the cylinder head has been removed several times.

His suggestion of a simple water-cooled engine is unique, but it would seem that before long the water would boil, there being no prearranged system of circulation, as in the honeycomb type of radiator. Then, again, is not the operation of unscrewing the top of the float chamber and filling it with petrol simpler than procuring a few kettles of boiling water?

Mr. Hitchcock's conception of an "ideal engine" for heavy sidecar work is surprising. A 1,000 c.c. single-cylinder sidecar combination! Now the torque of a good single is tolerably good, but even the most enthusiastic admit that the smooth running is seriously compromised by the attaching of a sidecar. It is a significant fact that there are few single-cylinder sidecar machines of 600 c.c. and over, although, on the other hand, there are plenty of twin sidecar combinations which fall short of the "Norton Big Four" quality. The 5-6 h.p. Rudge of, I think, 750 c.c. is probably the largest single in common use, so that there seems little prospect of the 1,000 c.c. single, even water-cooled, being introduced as the power unit of our sidecar *de luxe* after the war. He also suggests an outside fly-wheel on this single-cylinder, apparently for a more even torque, yet in the next sentence he says it must not be too heavy, *as it would then give too even a torque.* Does he make this statement seriously? because, if so, he may rest assured that he will never get "too even a torque"—from a single-cylinder

As regards galvanising various parts of the machine, does your correspondent know that metal so treated is considerably more brittle than ungalvanised metal? Thus, however suitable such a procedure may be for the water jacket, it would be risky for the more vital parts of the frame; such an improvement can only be made where it is compatible with safety.

If Mr. Hitchcock is such an enthusiast of the water-cooled sidecar *de luxe*, what more does he want than the 6 h.p. water-cooled Humber "flat"? W.F.C.
Ulverston.

Sir,—Relative to your article on water-cooling *v.* air-cooling in your issue of March 15th, possibly my experience of the former may be of some interest. Before the war I purchased a new Green-Precision engined motor cycle of 499 c.c. for the dual purpose of solo and sidecar work. This particular type of engine is fitted with a copper jacket and radiator directly to the cylinder, overhead valves, and rather higher compression than the air-cooled type, otherwise it conforms to standard practice.

Previous to purchase I was afraid that the excessive vibration would be the cause of joints becoming loose over our very bad roads; but, so far, my fears have not been realised, although the machine has nearly 10,000 miles to its credit. It is never spared hard work—often there are two passengers in the sidecar, making a total weight of approximately 800 lb. The solo and sidecar work is about equal. The valves have never been ground in, the oil consumption is over 3,500 m.p.g., and the petrol consumption a little less than with an air-cooled engine of similar capacity. The chief points with this type are the high power constantly developed, and extreme flexibility; in both of these it may be said to be very considerably in advance of an air-cooled engine. Personally, I cannot imagine a more suitable dual purpose mount as the cooling system is perfect, and water does not waste away to any appreciable extent—a cupful in 1,000 miles suffices, and decarbonising every 3,000 miles is quite often enough.

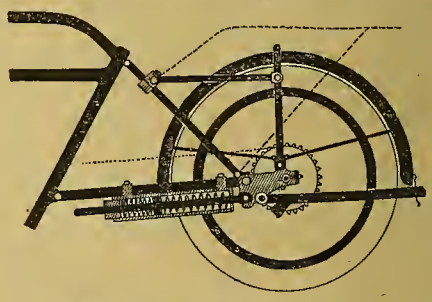
The only objectionable feature is due to the rattle of the overhead valve mechanism, but the wear of engine parts is negligible; only one tappet has had to be replaced and one piston ring (single ring piston).

Why this particular type of engine has not "caught on" it is difficult for me to say, as I have nothing but praise to bestow upon its performances in whatever capacity required.

I have no interest in the producers save as a very satisfied owner, who has had undeniably good results from air-cooled types of a considerable number of makes of the best machines, and who finds this Green-Precision quite 30% more powerful and more flexible than its more popular brother
Jersey. EPICURE.

A FRENCH SPRING FRAME DESIGN

Sir,—As a French reader of *The Motor Cycle*, I send you my idea for a new spring frame, easily suitable to any type



A design of spring frame submitted by a Parisian reader

of machine, and I think the rough sketch will be of interest to you and your readers. HENRY BOURSIAC.
Paris.

STROKE-BORE RATIO

Sir,—I have read with considerable interest the discussions on the question of the stroke best suited to the working of the petrol engine, and from the points of view of the different writers it is exceedingly difficult to arrive at any theoretical conclusion on the matter.

So far, it seems to me that practically for different purposes different designs are best.

At the same time it strikes me that the question requires far more research, and is a much more involved problem than many seem to think, and that before deciding upon such matters as bearing surfaces, etc., it is necessary to establish the first principles upon which all such matters depend.

If we consider the petrol engine, say, with a stroke of 3in., making, say, 2,000 revolutions a minute, and that means a piston speed of 1,000 feet per minute; and also if we consider the weight of the reciprocating parts apart from balance, and that these parts have to be given velocity and brought to rest in a very short space of time, it strikes me that this has to be done in a time and distance that is economically impossible, and that there must be considerable recoil in those parts acting against the power applied to the engine. This may, to a certain extent, be beneficial by relieving the pressure on the bearing surfaces. On the other hand, there would be considerable saving in decreasing the number of revolutions by increasing the stroke.

I merely wish to present another point of view. As I have said, the question is so involved that I have neither the data, nor am I able to give the matter sufficient concentration to form a definite opinion on the matter.
WILLIAM A. J. SIMPSON.

SUMMARY OF CORRESPONDENCE.

"Engineer" (S. Farnborough, Hants) writes that in the last paragraph of his letter (March 29th, page 288) "100 miles for 3d." should read "3d. per hour."

OVERSEAS SECTION.

A Commentary based upon Practical Experience and a Study of Overseas Opinions.

AS we have previously stated, the Russian specification for military motor cycles has already done more towards attaining the demands of Overseas riders than half a decade of grumbles, freely aired by the press, could have brought about. On another page we give a brief review of some of the various makes already adapted to the Russian specification, and it should gladden the hearts of our Overseas readers to learn that such firms as Sunbeam, A.J.S., Norton, Rover, Matchless, and various other distinguished makers, are now producing truly "Colonial" models, possessing the special features which have so long been demanded in these columns. Larger tyres and wheels, increased ground and mudguard clearance, and ample engine power are foremost among these, and, as regards the latter point, we venture to prophesy that such machines as the big Norton "single" will, in spite of certain local preference for the multi-cylinder, hit the foreign-made twin very hard when conditions of competition return.

POTENTIAL OVERSEAS MARKETS.

SLOWLY but surely we are compiling a mass of data which concerns the portions of the earth where motor cycles are being used. Truly, the buffalo trail becomes the pack trail, and as the pack trail is the forerunner of settlement, the motor cycle goes with it. To-day, like the motor boat, it is often the forerunner of the railway, and from the most astounding quarters of the globe, from the fly-infested forests of South America, from the virgin jungles of India, from the sands of little-known Australia, from the Himalayas, Rockies, and the Pacific Islands, come the letters of keen motor cyclists. All tell the same story of widening markets, of keen foreign competition, of the unsuitability of certain types of machines; all hint at the same question, "Does the British manufacturer realise?" It is very clear that British goods are favoured. The call is for suitable design and businesslike treatment.

The possibilities of the British motor cycle Overseas are indeed enormous. Britain feeds the world with the bulk of its pioneers, and with them goes the well-established faith in the finish and lasting qualities of British engineering productions. Our own Colonies alone offer potential markets, but, on the face of things, it is obvious that hitherto a lack of system and proper business administration has handicapped and deadened the industry. Therefore we must do more than merely produce the right machine. That is only an initial step. Satisfactory service at the other end, and the establishment of a system whereby the actual purchaser is assured of proper treatment on businesslike lines, are conditions yet to be realised.

South African motor cyclists have been enthusiastic in their endeavours to bring pleasure to those who have returned wounded and maimed from the war. Recently the East London Motor Cycle Club arranged an outing for wounded soldiers from German East and overseas. The run was about eighteen miles round the outskirts of the town, seventy-four cars and thirty-five sidecars being requisitioned for the purpose (the latter are portrayed). After the trip the men were taken to the beach to "Our Boys' Hut" and provided with tea, cakes, cigars, and cigarettes. The foremost makes of motor cycles represented were British Ariel, Humber, Triumph, B.S.A., and Matchless.

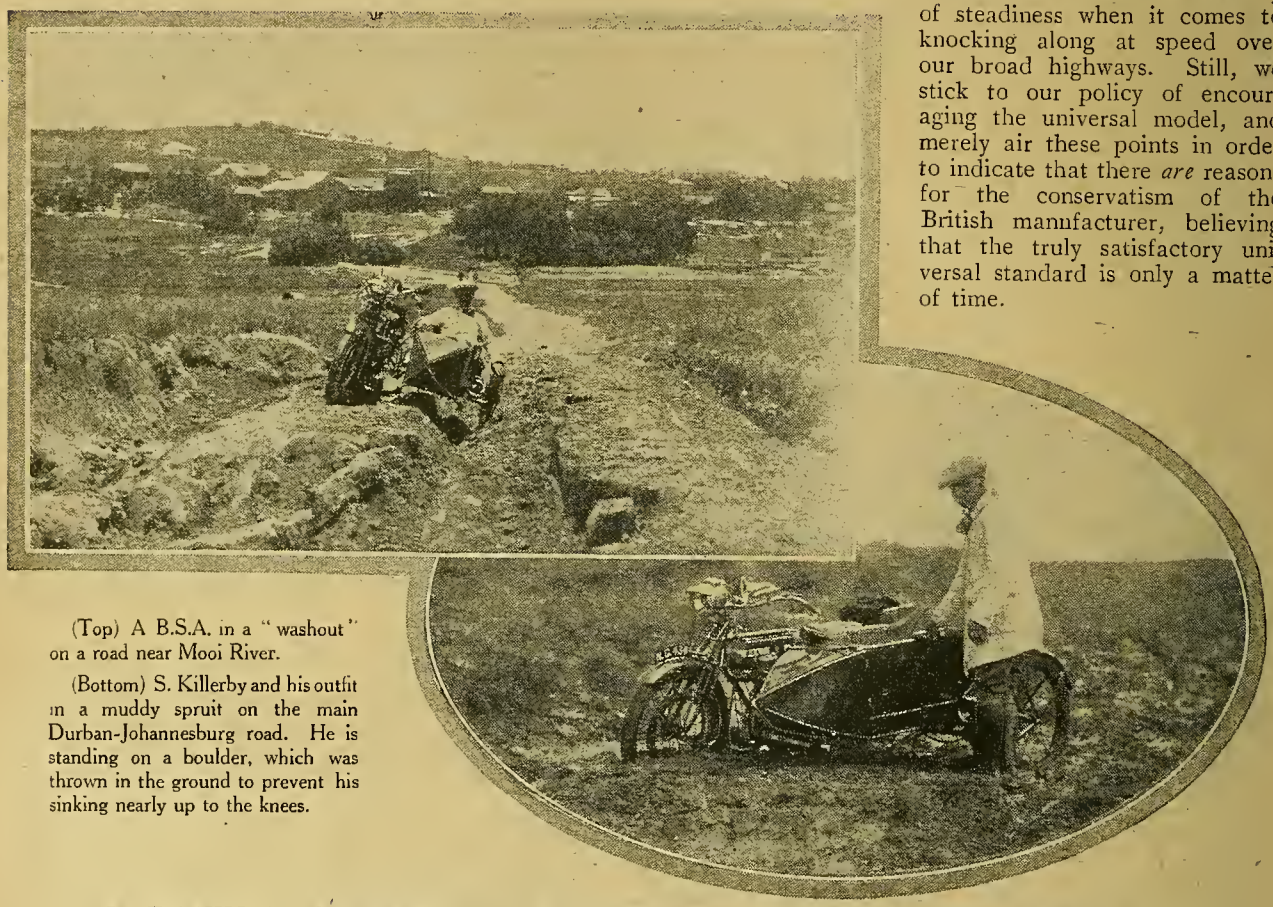
THE BRITISH SPRING FRAME.

THE British spring frame in the flesh is still a *rara avis*, but we need hardly repeat the information that the leading firms in this country are, without exception, busily at work on the rear springing proposition. Present conditions do not permit rapid development, but we have ourselves seen several designs which have every promise and will compare with anything at present on the market. These will appear in due course, but certainly not until their patentees are thoroughly convinced as to their efficiency and wearing qualities.

THE UNIVERSAL MODEL.

OVERSEAS correspondents regularly remind us that the machine built to meet Overseas requirements would give superlative satisfaction at home, but unhappily this is not quite so true as one might wish. We all want 28in. wheels, good mudguards with ample wheel clearance, weatherproof transmission, and so on, but it is as yet a moot point whether a ground clearance of more than 5in. is an advantage on anything but pioneer roads. Three-inch tyres, moreover, are not likely to attract the speedman, though for sidecar work and country pottering they are fine, and we have yet to find the spring frame which is all that could be desired in the way of steadiness when it comes to knocking along at speed over our broad highways. Still, we stick to our policy of encouraging the universal model, and merely air these points in order to indicate that there *are* reasons for the conservatism of the British manufacturer, believing that the truly satisfactory universal standard is only a matter of time.

SOUTH AFRICAN ROADS—ADMITTEDLY UNUSUAL—ON THE OCCASION OF A SIDECAR TOUR IN S.A.



(Top) A B.S.A. in a "washout" on a road near Mooi River.

(Bottom) S. Killerby and his outfit in a muddy spruit on the main Durban-Johannesburg road. He is standing on a boulder, which was thrown in the ground to prevent his sinking nearly up to the knees.

A FURTHER SELECTION OF LETTERS FROM READERS SCATTERED ALL OVER THE WORLD.

All-British Overseas Trade.

SGT. F. G. WRIGHT, c/o the Governorate, Alexandria, Egypt, sends us the following patriotic letter:

"In your issue of February 8th I was somewhat interested in the article concerning the Simplex power unit, and would be glad to have from the manufacturers further details concerning it, if you would be good enough to put me in touch with them.

"I happen to be one of the many men who, although unfit for further Active Service against the enemy, would like to help in any other way, and think that by assisting our home manufacturers to get a footing in the coming commercial war, though not much trouble to myself, would be of great advantage to our Empire in general, and if only this suggestion were published there would be no lack of volunteers, the total of whose efforts must certainly go a long way towards putting us ahead of our neutral and enemy competitors as soon as peace is declared.

"About a year ago I went to the trouble of finding out what particular lines of goods were in enemy hands here, and was successful in sending a list of over 100 which could be supplied from my town only (Birmingham), and for which I received a letter of thanks from the Lord Mayor. Since that time I have had the pleasure of knowing that many of these lines were successfully replaced by British-made goods, which have given satisfaction, and here the presence of troops alone is creating a big demand for home manufactures.

"In civil life I was a Continental traveller, and if the Government as soon as peace is declared gives the necessary facilities to our manufacturers' representatives it should go a long way towards guaranteeing new markets and increased orders in the old ones.

"The French and Italians are losing no time in securing orders *now*, and the Americans also show signs of progress in some lines, motor cycles and accessories in particular.

Overseas Section.—

"It may be of interest to you to know that the light car has been a great success on the desert journeys, which should go a long way towards booming it here after the war.

"I wish particularly to point out to the heads of our manufacturing firms the absolute necessity of agencies being put in the hands of Britishers, for otherwise we shall be back in the same rut as before, when enemy agents made use of our brains for the benefit of their manufacturers, and British samples were shown as enemy ones. Let us have British Consuls, more progressive systems for our chambers of commerce, British agents, and, above all, let us try to show the value of our goods printed in the languages of the parts of the world in which we trade.

"The greatest eye-opener to many of the men now abroad is our lack of knowledge of foreign languages! This being a cosmopolitan place, one hears children of seven years speaking as many languages, and although the percentage of natives here who cannot write is very high, nevertheless they can speak three or four langnages.

"If there are any firms among your advertisers who would be glad of any little assistance I may be able to give them I shall only be too pleased to do so during what spare time I have. I do not ask for any remuneration—in fact, I am forbidden under the military law from accepting any; but I feel that every little help that any of us can render while out here will be of as great importance as what bit we have already done as soldiers.

"Although we have to pay two piastres (5d.) here for your paper, we are greatly interested in the progress shown and the interesting articles published.

"Wishing your paper every success."

Low Gears Desirable.

"S.G.W.," Australia: "Generally speaking, our roads are of two kinds—made and unmade. The made roads (of which we have a very considerable mileage) are firm, but the surface is like corrugated iron much magnified. The unmade roads mostly consist of sand in dry weather and clingy awful mud in wet weather, and the inevitable cart tracks. To contend with these conditions we want power, but we also want ease of control and reasonable comfort without great weight. Most English machines fail in some respect or other, and almost every one has much too little mudguard clearance and too small tyres. Finish is not of such great importance, provided we know the material and workmanship are there. American machines are selling by the hundred, but they do not completely fill the bill. They are too heavy unless used with a sidecar, and there are other defects also. Nearly all motor cycles are geared on top much too highly. There are always a few who will have high gears and open exhausts under any conditions, but from my experience there is no pleasure in jockeying a machine over bad roads on a high gear."

An Australian Reader's Frame Design.

Mr. C. M. Ross, Brisbane, N.S.W.: "I was very pleased to see the account of the Scott Sociable in *The Motor Cycle*, and to observe that Mr. Scott is making use of a completely triangulated frame.

"I feel quite confident that once the trade recognises the advantages and the hugely increased strength of this construction, as compared with the present misshapen motor cycle and sidecar frames, all frames will be built as completely triangulated structures. This was indicated in my letter on frame design in *The Motor Cycle* of June 3rd, 1915. I also sent you another letter and a blue print of a frame later on, which was apparently lost in transit, as it was not published.

"At present I have nearly finished a frame which is completely triangulated. I will send a photograph of it when finished.

"I have made some of the joints with the ordinary external rigid lugs, and others with eye and jaw ends, and can quite agree with Mr. Scott that the latter are much the better and cheaper type of lug. I see no reason why every joint should not be made of eye or jaw and bolt connections. Besides eliminating all bending stresses in the plane of the frame, the great advantage of this construction is that the cylinder head can be placed closer up to the tank tube, and therefore greater ground clearance obtained. The cylinder is then easily removed by undoing a bolt and swinging out the front tube."

New Zealand—Some Good Going!

"HW 553" gives us the following impressions of New Zealand roads: "I have been for some considerable time an interested reader of your valued journal, during which time various letters relating to road conditions in New Zealand have appeared.

"While agreeing that, on the whole, the New Zealand roads are not to be compared with those in England, I would like to point out some exceptions.

"For instance, in the Taranaki district, the main roads are practically all that can be desired from a motorist's point of view. From New Plymouth, right round Mount Egmont, and back to New Plymouth a good portion of the road is of 'Tarvia' formation, the remainder being gravel, well graded and rolled, with good bridges over all streams.

"As for scenery, well, you have to visit New Zealand to know what natural scenery really is. No other country can compare with it.

"One certainly encounters a few herds of cattle, etc., but I venture to suggest that New Zealand is not the only civilised country in which cattle are encountered on the main roads.

"I am not trying to compare Colonial roads with English, but am just pointing out that we do not have to ride all the way there and back through swamps, mud, and unbridged rivers."

Another Specification.

Mr. J. F. Good, P.O., Matiwane, Natal, writes: "I have been a reader of your paper for some time now, and would like to express my appreciation of your Overseas Supplements. I would suggest a machine built on the following lines: It must be able to stand any amount of rough usage. It must have a good clearance, and be fitted with large size tyres. The mudguards should be large and of such design that they will not clog up the front or back wheels with mud. It should have a three-speed gear. The engine should be a powerful one, preferably 6 to 9 h.p. The frame needs to be well sprung, nuts should be split pinned, and chain drive is absolutely essential. The control should preferably be of the twist grip system, the footboards large, long, and capacious, with leather mats in preference to rubber. As far as possible the machine should be protected against all weather conditions. With an English machine built on these lines I am pretty sure the manufacturers would soon capture the Colonial market."

Price of British Machines Abroad.

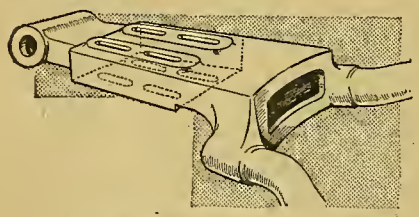
Mr. C. Butler, Camden, N.S.W., writes: "Strong frames are a necessity for the roads in New South Wales, with heavier gauge springs than are usually fitted to the front forks of British machines. This is a very weak point on several well-known British machines, and it is found necessary to fit heavier springs after the first run with a new machine on our roads. Heavy gauge spokes and rims should be fitted, and all machines intended for sidecar use need at least one security bolt in each wheel Solo machines from 3½ h.p. upwards should have 2½in. tyres and passenger machines 3in. Large tyres, I find, give greater life, are less liable to puncture, and also protect the rims. There is vast room for improvement in the mudguarding of machines sent out for use in Australia. A greater mudguard clearance is necessary, and valances are of little or no use on our roads, except for city riding. Tanks of at least one and a half gallons for solo and two gallons for passenger machines are necessary, as it is often impossible to procure petrol in the small towns, especially on Sundays. Owing to shortage of British machines on the market American machines are greatly on the increase. Most American machines of 8 h.p., with three-speed countershaft gear, can be bought from £90 to £95, whereas most English machines over 3½ h.p. with three-speed countershaft gear cost over £100. My present machine, a 6 h.p. three-speed countershaft gear Speedwell M.A.G., cost £110, and then there is lamp, horn, etc., to be bought on top of that, so that motor cycling is rather an expensive pastime out here. The present price of petrol is from 3s. per gallon. Another small item English manufacturers would do well to include with each new machine sent out is a book of instructions, directing agents to see that every buyer of a new machine gets one. Very often a machine is sold to a raw amateur, and, for the want of a little knowledge as to the care and attention of the different parts, the machine does not get justice done to it."

A NEW IMPERIAL RUSSIAN MODEL.

A Design Primarily for Heavy Sidecar Work.

AMONGST the firms participating in the Ministry of Munitions' Order for special machines intended for use in Russia is the New Imperial Co., of Priucip Street, Birmingham. This firm has produced a machine in which power and strength are the predominant features.

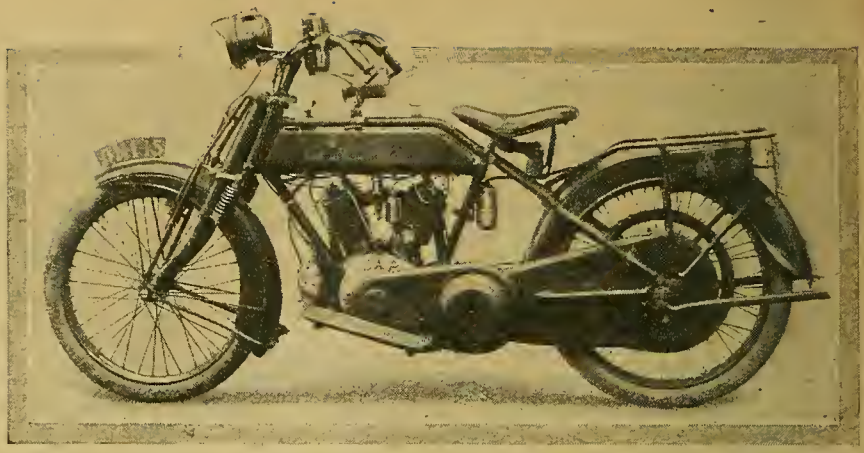
The particular specification to which these machines must comply contains several striking departures, such as a minimum ground clearance of 6in., and 28in. wheels shod with 3in. tyres. These two points alone necessitated a completely redesigned frame, which has resulted in



The special gear box bracket is one of the chief means of obtaining a big ground clearance. Proper alignment when adjusting the chain is ensured by the carefully machined slots.

a very sturdy piece of work eminently suitable for the rough conditions it is expected to survive.

The principal details are: Engine, 8 h.p. J.A.P. V twin, 85½×85 mm. bore and stroke, 976 c.c., surely capable of all the power needed, no matter what the conditions. All-chain drive through a specially made countershaft three-speed gear box with hand-controlled clutch. The Renold chains are unusually heavy,



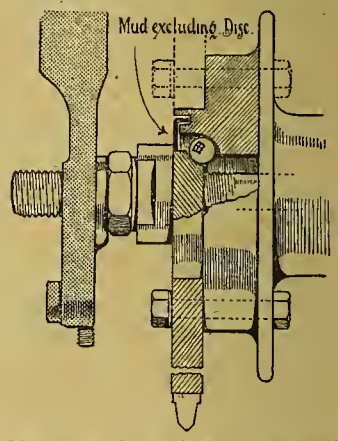
Transmission side of the 8 h.p. chain-driven New Imperial Russian model. A feature at once noticeable is the increased ground clearance.

one being ⅝in. pitch × ⅜in. wide, and the other ¾in. pitch × 7/16in. wide. The clutch has three plates castellated on the shaft, and three plates engaging the inside of the shell, cork insets, and six springs. The gear box follows good standard lines, two dog clutches operating the top and bottom gears, driving solid on the top; two sliding pinions give the middle gear. An easily accessible inspection cover is provided. A cushion drive is incorporated in the inner driving sprocket, all shocks being damped by no fewer than sixteen rubber buffers. The chain sprocket on the back wheel is held by five 5/16in. pins to an exceedingly substantial hub. The kick starter is well made and unobtrusive.

Six and Threequarter Inches Ground Clearance.

The whole drive is enclosed in a metal casing of a heavier type than usual, with a minimum of attachments rendering removal an easy matter, which does not necessitate disturbing other parts. The clearance below the bottom of the gear box is 6¾in. Other details are: B. and B. carburetter, Thomson-Bennett magneto, an efficient silencer tucked away behind the crank case out of harm's way, with a short extension pipe to complete it, and a large tank, holding over two gallons of petrol and about a quart of oil, with neat filters at the filler cap and petrol tap. The words "oil" and "petrol" are inscribed alongside the respective filler caps in English and Russian.

Mudguarding is well considered, 5in. being the average width. Front forks are made specially wide to accommodate the increased width of guard. The carrier, built of stronger tubing than usual, is 10in. wide, and swings down with half of the back mudguard for access to the back wheel when needed. Aluminium footboards are provided, fitted so as to

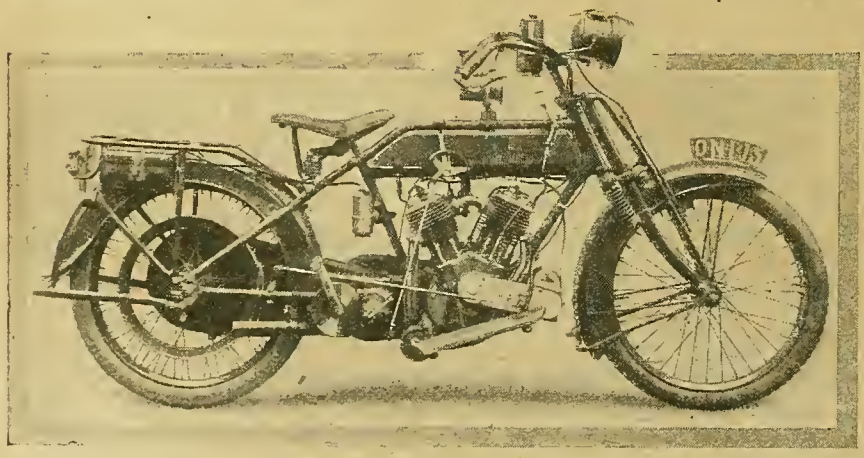


The back and front hubs are rendered weatherproof by metal discs running in recesses tucked in the hub shells.

obviate interference with the removal of any other part of the machine, except, of course, the engine itself. An efficient mud-excluding device is incorporated in both front and back hubs, where again the strength is a noticeable feature; axles are ⅝in. diameter and balls 5/16in.

General Appearance.

The general appearance is not what we have been accustomed to consider good in our usual English low-built machines, by reason of the excessive ground clearance, but we anticipate that these machines will stand up to the heavy work they will meet in Russia with every success, and, no doubt, many of their good points will find their way into the English models of the future.

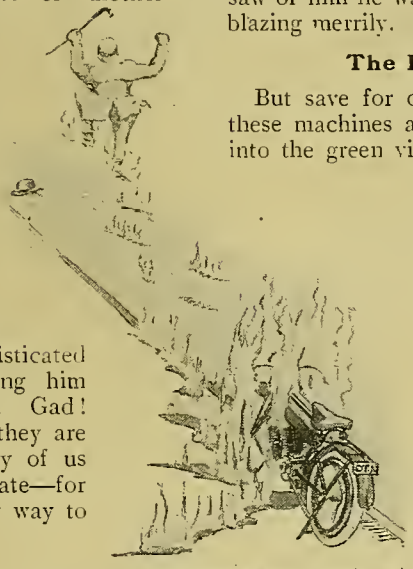


Valve side of the 8 h.p. New Imperial. The engine is 85·5 × 85 mm., and has a capacity of 976 c.c. Renold chains, of a pitch of ⅝in. and ¾in., are fitted.

Retrospects of a Rural Rider

Being a Few Jottings from the Mental Diary of a Country Rider.

In these days of toil and stress we live our leisure moments in a land of retrospect. That, I consider, is a fairly good journalistic kick-off. By "we" I refer to the motley brotherhood of motor cyclists. As a brotherhood we are scattered to the four winds, but whether shivering in the trenches of mother earth, or cowering behind the dripping, draught-creating tarpaulin shield of a W.D. lorry, the retrospects come floating back in idle moments. Fragrant whiffs of green downs or purple slopes, where a timid old ewe, the sole sign of life, stumbles with motherly solicitude over her straddle-legged offspring; glimpses of winding white roads, where the scents of evening hang about the hedgerows—of sparkling streams, girt by dew-drenched meadows, where the ever unsophisticated coney bolts in terror of our following him down into the bowels of the earth. Gad! How far away these places seem, yet they are still waiting—a word with which many of us have become tolerably familiar of late—for the sword of justice to hack its bloody way to peace.



An excitable and volatile old gentleman made futile attempts to stamp out the flames."

Alpha and Omega.

In our memories of the road there is always one old jigger which stands out in visionary contrast from the rest. It may have been no better than the others—often it was the worst—but perhaps we possessed it longer than most of them, so that it became a part and parcel of our being. I have known man and motor to live so long together that both partook of the characteristics of the other. Between them cropped up an erratic and explosive similarity—a sympathetic indifference as to the proper time of coming and going, and a corresponding unexpectedness in their deeds and movement.

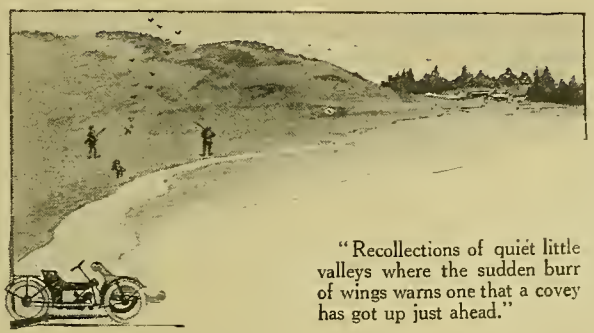
My first mount was a 2¾ h.p. Rocket, the makers of which have apparently burst. My second was a New King, which, after a distinctly miserable career, deliberately committed suicide. I had left it outside a Brighton café (where I was madly in love with a junior waitress) when, without anyone even looking at it, the "New King" suddenly burst into flames. In a minute or so rivulets of fire were spreading over the gutters, when an excitable and volatile gentleman, wearing hemp soled shoes, started to make futile attempts to stamp out the flames. Needless to say, the soles of his shoes mopped up the petrol and caught fire, and the last I saw of him he was leaping wildly in mid-air, both feet blazing merrily.

The Days of Dog and Tricar.

But save for outstanding incidents, the memory of these machines and others that followed have melted into the green vistas, and of those early days the old 4 h.p. Bumper tricar with inclined engine, clutch, and two-speed gear box, is the only unblemished memory. This machine was really reliable, except for eternal and malignant clutch slip, and I possessed it at a time when youth and ample leisure afforded every opportunity of getting the best out of life.

There were, for instance, the days when young Brett and I went shooting at Aunt Matilda's. Aunt Matilda was a maiden lady who possessed an extensive though somewhat impoverished estate twelve miles distant.

As the grey autumn dawn broke, Brett and the guns and cartridges were packed into the roomy forecar, and the next thing was to get the necessary sleuths, Punch and Nell, aboard also. In this William the gardener was always called to assist, for neither of them was exactly a lap dog. Nell was a lurcher—that is, the least common multiple of all dogs, with greyhound predominating—while Punch was a loose-lipped, sloppy-footed old spaniel, the lovable descendant of a long line of pig-headed ancestors.



"Recollections of quiet little valleys where the sudden burr of wings warns one that a covey has got up just ahead."

Nell was lifted by William on to Brett's knee, where, overcome by the novelty of being nursed and by the delightful proximity of His Satanic Majesty the shot gun, she would proceed to demonstrate the occasion by a storm of affection that left the cooped-up Brett breathless. In the meantime I was "yanking" the handle, while Punch had settled

down to scratch himself with a vigour which aroused Brett's suspicions.

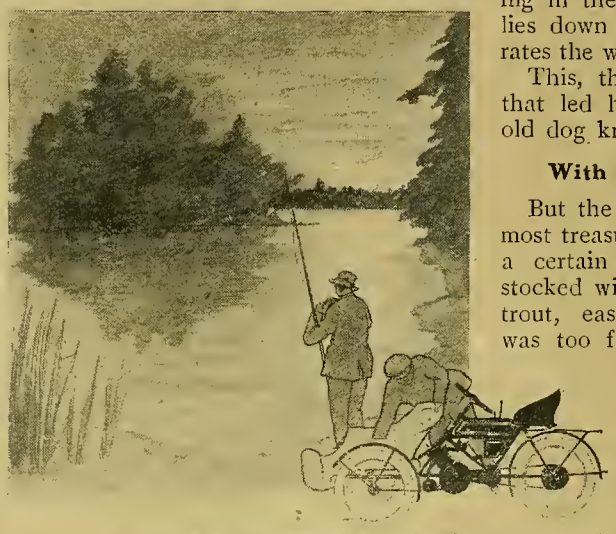
"Never mind, sir," William would console him. "They won't live more'n a day or two on a human being. I'll soon 'eave old Punch aboard."

Punch, however, had made up his mind to walk, and nimbly evaded William's coaxing advances. "He thinks he's going to be bathed!" William explained—that being the one outstanding horror of the old dog's life.

"Wouldn't do him any harm, either!" growled Brett.

Aunt Matilda's Curry.

Good old Aunt Matilda! Most of us have our weaknesses, and sometimes they tend to develop our strong points. Succulent walnuts grew in Aunt Matilda's croft, together with a forbidden mulberry bush, strongly reminiscent of schoolboy days. She made delicious mince pies, and her sweet Christmas wines were without parallel. But her weakness was for none of these; she loved curry, real, genuine, Indian curry, hot as blazes, and her strength lay in the making of it! Old Indian residents came from far and wide to sample Aunt Matilda's curry. The manufacture of it was a matter of personal pride, and one had to praise it even though it singed one's hair upwards from the roots. We used to start the engine on frosty mornings by holding some of yesterday's curry to the carburetter.



"... a certain sheet of water well stocked with rainbow trout."

The Destination.

One has soft recollections of quiet little valleys hidden in morning mist, where the sudden burr of wings warned one that a covey of partridges had got up just ahead, and one waited expectantly for them to emerge from the mist as they breasted the opposite slope. At present we are working the gorse, to the accompaniment of a magpie—clever enough to keep out of range in the timber—and an occasional snapshot is the most one can hope for. But the air is pregnant with the scent of moist bracken, and there is a sharpness in the atmosphere which gives a zest to life.

Soon we begin on the hedges. Nell takes it easily, while old Punch, possessed of less judgment, blunders blindly through the thickets. Finally he strikes a scent and Nell dashes in; it may bolt either side of the hedge and in either direction; it may prove to be a rabbit, a hare, or even a fox. There is a tense three minutes, then a shot and quietude.

Suddenly Punch gets an idea, and when Punch gets an idea something unusual is astir. After toiling hard and unscrupulously for a couple of hours, he sets out, without the least warning, towards an adjacent hedgerow. No use calling him back; when a spaniel hits on a notion the rest of the company may as well click their heels and fall in. Away he plods, Brett, myself, and the game boy following respectfully, and telling each other that the old dog knows a thing or two, and has probably scented game from afar. "Just wait and see!" we tell each other breathlessly.

Across the field we find a small round pond, at which Punch proceeds to drink, and not content with drinking in the ordinary way actually lies down in it, rolls in it, saturates the whole of his person in it.

This, then, is the Holy Grail that led him forth! Truly, the old dog knows a thing or two!

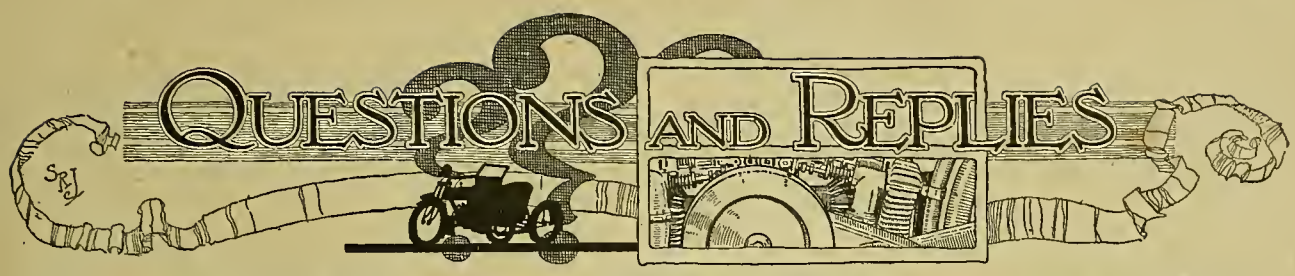
With Rod and Tricar.

But the old tricar was perhaps most treasured because it brought a certain sheet of water, well stocked with magnificent rainbow trout, easily within reach. It was too far to drive, train service was bad, so that a day's fishing meant either motoring or a sweltering cycle ride and missing the evening "rise." By utilising the old 'bus we were able to make full use of the expensive day ticket, and could remain for the evening fishing—always the best. One recalls the clamour of the quarrelsome waterfowl, the clouds of mosquitoes that rose from the grass, and the thousands of rudd—gigantic fellows some of them—which, when in the mood, rose merrily at anything. But here was a sandy bottomed bay, and the surface suddenly breaks into rings as a black snout and dorsal fin emerge from the surface. Milord the trout!

There is a swirl, a snap, and next moment the line is zipping out between one's fingers as a four pound rainbow leaps time after time forty yards distant. Not once in a way, but two or three times in the dusk of a long summer's evening did one experience this after luckless train men had despondently left the water.

One day, after lunch at Aunt Matilda's, we lost old Punch. The French window of the dining room was open—had the old blighter sneaked in and stolen a mince pie? No, he was not there. We called, whistled, and shouted, but no one had seen him. Aunt Matilda wrung her hands in dreaded expectancy that he had blundered into a fox trap, but the mundane Brett inclined towards the view that he was rolling on a dead crow, and would come when the fancy took him. Then someone caught sight of a strange apparition down by the duck pond. We flocked to investigate. There was old Punch vainly endeavouring to stand on his snout in the cool, caressing mud. At intervals he paused to sneeze convulsively, and around his muzzle was a ring of greenish yellow substance. He had been sampling Aunt Matilda's curry!

CHINOOK.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects

Starting on Coal Gas.

Is it practicable for a motor cycle to be started on coal gas? If not, can you please inform me by what means, other than petrol, this could be accomplished?—T.G.W.

Yes, a motor cycle could be started on coal gas, but the difficulty would be to carry enough of it; you might start better on acetylene gas.

Blacking the Handle-bars.

The handle-bars of my machine have become dulled and somewhat rusty, as have the handle-bar fittings. If I remove the rust and give them a coat or two of dead black enamel, will the enamel lie well, or will the work have an amateurish appearance?—E.B.D.

To get a good result you must remove the rust with paraffin, or, if very bad, with emery paper. When all the rust has been removed so that the handle-bars are clean and bright and perfectly free from grease, give about four coats of dead black enamel—a very thin coat each time, allowing each coat to dry hard before applying the next. Then the effect should be quite presentable.

Changing Gear on a Runabout.

I have just purchased a little two-seater runabout, make uncertain, fitted with an 8-10 h.p. J.A.P. air-cooled engine, with a two-speed epicyclic gear, and shaft drive to live axle. The method of operation of gears is rather peculiar. There is no clutch pedal, but the engine is free in either gear until I press the pedal home (separate pedal for high and low gear), and keep the pedal in whilst running. While this is a very simple arrangement, I cannot quite see how to start the car properly. I presume it should be started in low, and after going some little distance should engage high; but, if this be done, should the high gear be put in before withdrawing the low? Unless this be done the car would naturally slow up, as the gear was declutched, and I cannot then see the advantage of first engaging low. I may add that the little car runs remarkably well.—C.O.T.W.

You should disengage the low gear and quickly engage the high, at the same time raising the exhaust lifter unless the gears are operated frictionally. If you do this rapidly enough the car will not slow down appreciably. Of course, you must first engage the low gear, otherwise you will not be able to start the car from standstill.

Gear and Chain Adjustment.

I have just recently purchased a 3 h.p. Royal Enfield with the Enfield gear. When I had it first the gears were quite silent, but after about two months' use I took the gears practically adrift, also the kick starter clutch which is embodied in these gears. I then had them reassembled by a dealer supposed to know about these machines, but ever since then there is a continual buzz or hum coming from the gear case, which is not only unpleasant, but it also shakes a lot, shaking the screws out of the gear case.—G.F.W.

The 3 h.p. Enfield contains no gear box, but a couple of selective clutches. Possibly one of the chains is too tightly adjusted. This should be rectified at once, or broken rollers will result.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

Loss of Compression when Warm.

When my engine is cold or even cool the compression is everything that could be desired, and then after, say, half an hour on the road at an average speed of 18 to 22 m.p.h. the compression is almost *nil*; in fact, the last time this occurred I could start up without lifting the exhaust lever. If ascending a rise at a decent speed there are violent misfires accompanied by a metallic "click" (not a "knock"). The valves and piston rings are in good order, and the silencer is clean. The carburetter is a Binks, with jets 000, 7, and 10 fitted.—L.W.R.

The compression is good when the machine is cold because the oil is thick and sticky. It is possible that the loss of compression may be due to a cracked valve seating, the crack opening when the cylinder gets warm, or to the tappets not allowing the valves to close properly. Without actually seeing the machine it is difficult to say definitely what is the matter with it.

Running on Naphtha

(1.) Could I run my 6 h.p. J.A.P. combination on mineral naphtha? If so, what effect will it have on my engine?—C.P.

You can run the machine in question on naphtha. You will probably be able to use a smaller jet or admit more air to your carburetter, otherwise the effect would not be deleterious, but starting is difficult with this fuel in cold weather.

Carburetter Adjustment.

I have reassembled a 1912 two-speed Douglas after overhaul, but, not understanding the standard carburetter, fail to get a start, although I have been a motor cyclist since 1904. Is the throttle fully open when the slide is below the jet or above the jet?—N.S.S.

The carburetter is quite a simple one. The throttle is fully open when the slide is above the jet, because in that position it leaves a free passage from the jet to the inlet pipe. If you make sure that the air is properly cut off and that the jet is clear we do not think you will have any trouble in starting. Make sure that your throttle control wire is of the correct length.

Running on Paraffin.

My machine is an 80 mm. × 80 mm. four-stroke single, with a.o.i.v. and with fairly high compression, and I wish to run it on paraffin with a Senspray carburetter. (1.) Is this carburetter as satisfactory for paraffin as any other make? (2.) What size jet ought to be used to give full power? It does not matter if the machine is a little extravagant as long as it gives full power. (3.) Is common lamp paraffin suitable, or does more refined paraffin give appreciably better results? (4.) I am fitting a Silver vaporiser and a gauze cone and coiling the paraffin supply pipe round the exhaust pipe. Is the latter necessary, and is a hot air intake desirable?—Y1.

(1.) Yes, the carburetter is quite satisfactory for using paraffin if equipped with a warming device. (2.) We should recommend you to use the standard size jet, but have the next size larger and the next size smaller by you to experiment with. Probably a smaller jet could be fitted with advantage. (3.) Common paraffin gives good results, but the more refined paraffin is cleaner. (4.) The precautions taken here should ensure the vaporisation of the paraffin, while a hot air intake would also be beneficial.

Changing Speed.

Will you kindly tell me the correct way to change gear on a counter-shaft three-speed geared motor cycle. When changing up—(1.) With clutch on gear box, on engine-shaft, or in rear wheel? (2.) Is the practice of double clutching used when changing down on a motor cycle?—S.K.

(1.) No matter where the clutch is put, you either declutch or raise the exhaust valve when changing up. (2.) Double clutching is not used on a motor cycle, as it is unnecessary.

Dressing Oilskins.

(1.) Will you kindly tell me how to dress a black oilskin? It does not require dressing all over, only some of the seams needing attention. (2.) Do you think I should have any difficulty in starting with one-third paraffin and two-thirds petrol, without fitting a special hot air intake?—E.A.C.

(1.) Apply a little boiled linseed oil and allow to dry. (2.) With such a mixture you should be able to start quite satisfactorily in warm weather. A hot air intake, however, would be of service.

Trimming Platinum Points.

(1.) The platinum points on my magneto contact breaker have not been in complete contact, as there is a collar worn on both. Would you advise me to file this collar off both points and alter the latter to bring them into full contact? (2.) After the proposed attention the points will be less than ½ mm. in length. Would it be safe to run these completely out or should I replace them now, and would you recommend "Jebron" points? (3.) In the event of my wearing the points to a finish on a journey, would the ordinary metal of the screws carry me home if filed clean occasionally? (4.) In the widening of my handle-bars I intend just to pull them out. Is this safe? (5.) On the old pattern magneto the metal spring holding the dust cap over the contact breaker had to be clean to save the platinum points. Does this hold good with the modern machine? (6.) Do you advise a hot air intake as well as a heated induction pipe with all heavy fuels? (7.) If *one* strand of a Bowden control wire to throttle is broken, would you advise a new wire?—T.D.

(1.) You should not file platinum, as it is a very precious metal. The best way to get it flat is to hammer it very lightly, and touch the points up with emery paper afterwards. (2.) It will not do to run the magneto with the points absolutely flush. They must be replaced when they get as low as this. We can thoroughly recommend Jebron points. (3.) The metal would carry the spark for a short time, but there would be much misfiring and they would soon burn away. (4.) To widen handle-bars properly they should first of all be heated. (5.) No; the condenser connection is inside in the contact breaker cover in the case of a modern magneto. (6.) Yes; a hot air intake as well would be an advantage. (7.) No; a new wire is not essential at the moment, but it is advisable to have one ready to be fitted in case of emergency.

Rims and Tyres.

My back wheel is now fitted with a 2in. tyre and tube. Can I fit a 2¼in. tyre to this rim? Will the 2in. tube suit the 2¼in. cover?—C.G.E.

You could fit a 2¼in. tyre to your rim, and use the same inner tube, but when the standard rims are placed on the market, 2in. and 2¼in. tyres will no longer be interchangeable. It would be better, however, to use a tube of the correct size and keep the smaller one as a spare.

Lack of Power.

I recently bought a second-hand motor cycle and sidecar, a 5-6 h.p. Chater-Lea-Peugeot twin, automatic inlet, and Bosch magneto. However, after several short runs, I noticed a falling off in power, and put it down to the piston rings, and decided upon a thorough overhaul. I took everything down, and found one piston broken away in the skirt and all six rings broken and worn. I have fitted new rings, also new piston in place of the broken one, made the usual small rectifications and adjustments, and added a hot air inlet to the carburetter. Upon making a trial run I was disappointed greatly with the result. The run was made on Petrofin and petrol—about one-quarter of petrol to one of Petrofin. The chief difficulty was that I could hardly get the engine on top gear (N.S.U.) at all; when I did it gradually slowed up after a few minutes (on the level), making it necessary for me to drop down on low gear. Of course, having to come down to low gear so much heated the engine up, and several times I had to stop for the engine to cool. The timing is set that the spark occurs 7 mm. from the top on the compression stroke when fully advanced. (This seemed correct in running.) The exhaust valves close just a shade before the top of the stroke, approximately $\frac{3}{32}$in. (I set these to the closing, not opening.) They open approximately ⅛in. to $\frac{5}{32}$in. from the bottom of the stroke. The exhaust valves lift about ¼in. off the face when fully open. The automatic inlet valves are adjusted to about equal tension, and open approximately ⅛in. The magneto gives a very good spark. (I may say I have not seen a magneto of any make give such a spark at slow and high speed.) Do you think it would do any harm to give the pistons a "rub in" in the cylinders with carborundum?—W.D.

The exhaust valves are timed rather early. They should close about .05in. down the suction stroke and open when the piston is about one-seventh of the stroke from the bottom of the power stroke. Your new piston may be a bit tight. You will do well to mix engine oil with your substitute until the piston is run in, but not enough to affect the viscosity of the fuel, say one-quarter of a pint of medium grade oil to two gallons of fuel. Do not attempt any grinding in of piston rings on an old engine. Probably the rings, etc., will face up better if left alone. Do not over-oil, as this will cause the automatic inlet valves to stick, or lag, at low speeds, resulting in unsteady running and misfiring.

Petroil.

I recently purchased a 2¾ h.p. T.D.C. two-stroke engine, and intend to use the petroil system of lubrication. I should be pleased if you would tell me the exact amount of oil to put in the tank to one gallon of petrol. I wrote to the people from whom I purchased the engine. They informed me it required so many filler caps, but as I do not know what a filler cap holds I am still as wise as before.—C.M.

The correct amount of oil to mix with one gallon of petrol is half a pint, or a little more when the engine is new.

Knocking on Heavy Fuel.

I have a 3½ h.p. three-speed motor cycle with coachbuilt sidecar. This engine runs remarkably well with pure petrol, but, owing to the stringent restrictions on this fuel, I have experimented with half petrol and paraffin, but find that the engine knocks badly on this mixture. I would be grateful if you would tell me whether this knocking may be prevented in any way when using this mixture. Also, when adjusting an Armstrong three-speed gear, should it be in gear or free engine?—A.G.G.

You may prevent the knocking to some extent by fitting a hot-air intake to your carburetter. We think this would cure the trouble. When adjusting the Armstrong gear this should be in the neutral position. See the article on the subject which appeared in *The Motor Cycle* of December 7th, page 490.

RECOMMENDED ROUTES.

MANSFIELD TO GRIMSBY.—J.W.G.

Mansfield, Edingley, Southwell, Newark, Lincoln, Caenby Corner, Brigg, Caistor, Grimsby; 82 miles. An alternative route from Lincoln, shorter but not so fast, is Lincoln, Langworth, Wickerby, Lissington, Rasen, Caistor, Grimsby.

BATH TO MARTOCK.—J.W.L.

Bath, Limpley Stoke, Beckington, Frome, Bruton, Castle Cary, Sparkford, Ilchester, Martock.

OXFORD TO LEEDS.—W.E.E.

Oxford, Deddington, Banbury, Fenny Compton, Southam, Coventry, Nuneaton, Atherstone, Melbourne, Derby, Alfreton, Chesterfield, Sheffield, Barnsley, Wakefield, Leeds.

BIRMINGHAM TO CLARE.—T.W.W.

Birmingham, Stonebridge, Coventry, Dunchurch, Daventry, Weedon, Northampton, Yardley Hastings, Bedford, Eaton Socon, St. Neots, Eltisley, Cambridge, Linton, Haverhill, Clare.

LONDON TO LIVERPOOL.—L.V.H.

London, Barnet, St. Albans, Dunstable, Fenny Stratford, Towcester, Weedon, Daventry, Atherstone, continuing along Watling Street as far as the village of Weeford, after which turn right for Lichfield, Armitage, Rugeley, Weston, Stone, Pipe Gate, Woore, Nantwich, Tarporley, Chester, Birkenhead, by ferry to Liverpool. Approximately 200 miles.

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Combined Inlet and Exhaust Valves.

ONE of the common aims in the production of an engine of high efficiency is to provide means whereby the exhaust gases may be expelled rapidly. To effect a quick discharge of these burning and expanding gases obviously a large opening is necessary, and, moreover, the exit passage must be so shaped that it shall provide an easy path for the gases. The first desideratum demands an exhaust valve of large dimensions, but there is, of course, a limit to the size which may be adopted, one governing factor being the possibility of a large valve head snapping off when the stem is comparatively slender in comparison with the diameter of the head, and another the cylinder diameter. In aeroplane practice we have inlet and exhaust valves arranged obliquely in the cylinder head in order to obtain the largest possible area.

Another type of valve which from time to time has attracted leaders in the automobile and aero engine world is the combined valve, or concentric valve, as it is sometimes called. A review of different constructions of this kind will be found in an article in this issue, and to this we direct the attention of designers interested in acquainting themselves thoroughly with other people's efforts to extract the utmost efficiency from a given size of engine. The combined valve is attractive for the reason we mention in our opening remarks, viz., that it renders possible the use of an exhaust valve almost as large, in fact, as the cylinder bore itself. By reason of the inlet valve being arranged in juxtaposition to the exhaust valve, another advantage of the concentric valves comes into being, since the cool inrush of gas past the exhaust valve seating tends to cool the valve itself and also parts in the region of the valve.

The combined valve is by no means new, as the illustrations and remarks in our article will show, but for various reasons not altogether clear it has made no real progress so far as car and motor cycle engines are concerned; still, it does not necessarily follow that it will remain for ever in the background. From a motor cycle point of view it has many attractive points, as those who take the trouble to study the article and drawings will agree, and it may yet come to pass that a motor cycle will be standardised with this form of valve.

The Control of Clutches.

ANY manufacturer or designer who may be in doubt as to the most suitable type of clutch control for motor cycles should heed the appeals of despatch riders at the Front, who seem to be unanimous on the subject. More than one has written to us expressing his personal opinion that no machine should be supplied for military work unless provided with handle-bar clutch control. It is almost superfluous for us to remind readers that motor cycling in the various theatres of war is a very different proposition from careering about the comparatively good roads which prevail at home, many hidden holes, deep ruts, and slippery surfaces, lying in the despatch rider's track. Consequently it is imperative for any D.R. to have complete control of his machine *from the handle-bar*. Were it necessary in emergency for a D.R. to release his hold of the bar to disengage the clutch a fall would be almost a certainty. The foot clutch is the next best proposition to the handle-bar control, but nothing like the same delicate engagement is possible.

To those manufacturers who may adopt a handle-bar clutch lever for the first time we would remark that a light wire is not sufficient; on account of its continual use it will stretch quickly, so that strength is a *sine quâ non* if constant readjustment is to be avoided. Some designers are even considering a more positive means of withdrawal than a wire. We have already seen one machine with a neat form of non-stretchable rod control.

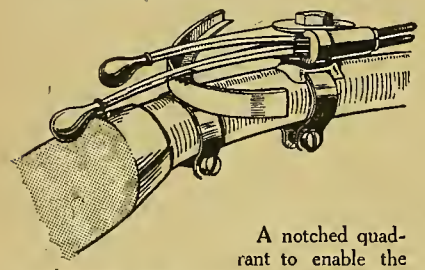
An index to the advertisements in this issue will be found on the page facing the back cover.

IDEAS: Useful and Ingenious.

Readers of "The Motor Cycle" are invited to contribute to this page any ideas successfully adapted to their motor cycles. Rough sketches will suffice.

STOPS FOR CARBURETTER LEVERS.

FEW things in connection with a motor cycle are more annoying than an engine which is difficult to control when running free during, for instance, a traffic halt. This difficulty of control is frequently made worse by too tight or too slack a throttle lever, rendering it difficult of adjustment to a nicety, or prone to move when adjusted. To render traffic riding as comfortable as possible, I have found the fitting shown in the sketch useful. It is far better than a positive stop, as the lever can be closed beyond the slow running position in order to use the engine as a brake and to avoid the use of the exhaust valve lifter.



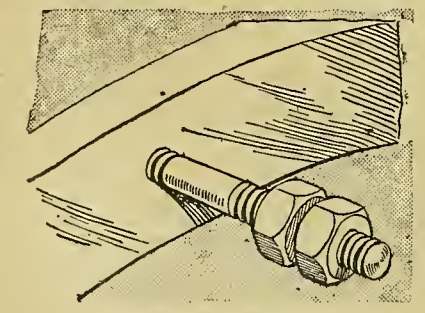
A notched quadrant to enable the carburetter control levers to be fixed in any desired position.

The fitting consists of a clamp to fit on the handle-bar, on to which a quarter circle of L section brass is screwed or soldered. In the brass three small notches are filed $\frac{1}{16}$in. apart, and a portion of the throttle lever is filed to a sharp edge to coincide with the notches.

Perhaps it would pay a manufacturer to produce such a fitting in one piece with control levers.—BENJAMIN ENGLAND, B.E.F.

REPLACING A STUD.

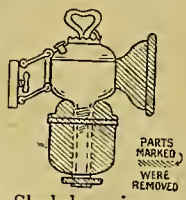
OCCASIONALLY difficulty is experienced in obtaining sufficient grip of a stud which requires screwing into a body. By locking two nuts on the thread, the spanner can be used to screw the stud quite securely.



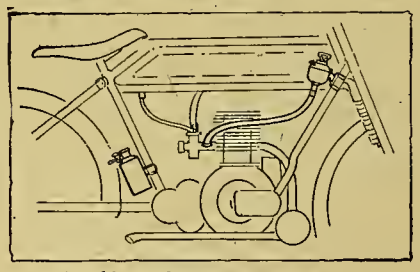
Replacing a stud.

STARTING ON PETROL.

FIRST an old acetylene bicycle lamp was obtained, and the parts removed which are shaded in small drawing. This was connected by copper tubing to a tap screwed into the induction pipe. The water container was fastened to the front of the frame by means of an ordinary lamp bracket. The container was filled with petrol, and so formed an excellent way of dripping petrol into the induction pipe for starting, when using substitute. As the capacity of the container was small, a paraffin can with a tap soldered in the top was carried strapped to the seat-pillar, and was kept filled with petrol for refilling the drip feed reservoir. This tip has been sent to us by Mr. K. Foster, of Four Oaks.



Shaded portions show the parts which were removed.

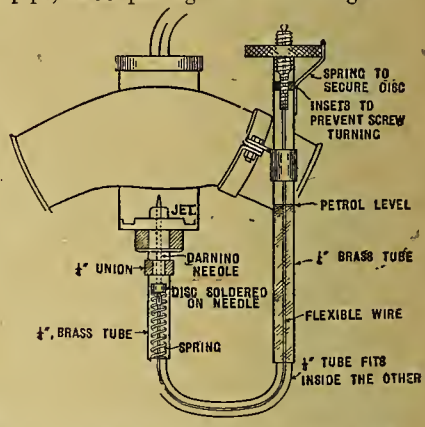


An old acetylene generator put to a useful purpose.

A VARIABLE JET.

A USEFUL design of variable jet has been submitted to us by a reader who signs himself "Capitano." He has found it by practical experience to be of great utility on the Matchless combination he uses.

The carburetter is the Amac, a hole being drilled directly underneath the jet and one half of a small union soldered in. An ordinary darning needle is used to make the variation in the jet, a disc being soldered in the needle near the eye for a spring to press upwards on, the needle being pulled down against the spring by a flexible wire which goes through the tube, and the whole is bent in a U shape, thus making a trap so that the petrol cannot run out. The top of the U piece is fastened to the induction pipe, thus placing the controlling screw

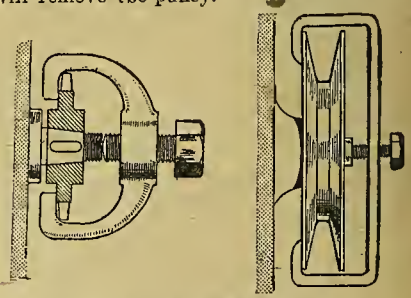


A self-explanatory diagram of a controllable jet opening.

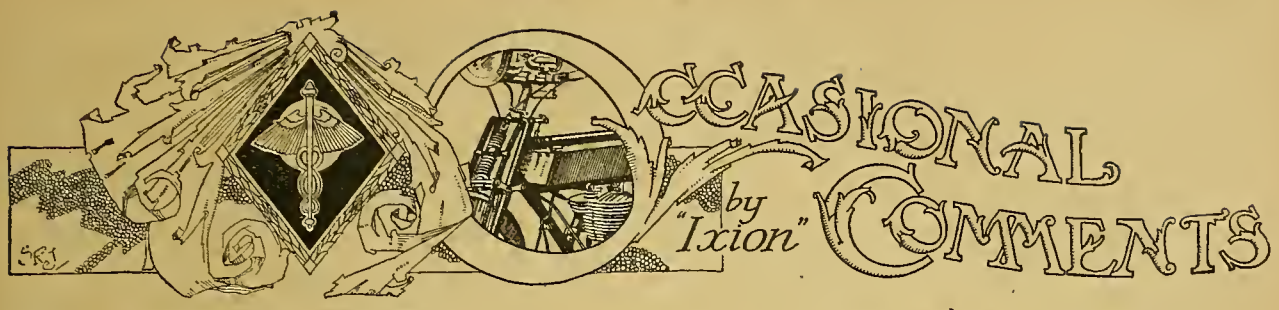
governing the action of the needle near the hand when riding and convenient for altering. The other half of the union is soldered into the needle end of the U-shaped tube after the needle has been pulled down against the spring, thus making it all one piece for removing if necessary.—CAPITANO.

REMOVING PULLEYS.

FREQUENTLY it is found that the pulley or sprocket wheel is such a tight fit on the shaft that it is impossible to remove it by ordinary means. A simple tool can be made by heating a strip of iron of suitable thickness and bending it to the shape shown, and of such a size to accommodate the pulley. A hole is then drilled in the centre and tapped out to fit a machine screw, which should preferably be pointed. By now applying a spanner to the head of the screw and turning it to the right, the arms of the yoke will be forced up against the pulley and a tap on the screw will remove the pulley.



Tools for removing pulley and sprocket wheels.



How a Flat Twin Wears.

TWO of the allegations quietly circulated against flat twins are that their connecting rod bearings wear rapidly and that the piston rings of the front cylinder get burnt into their grooves after a moderate mileage. I am busy decarbonising my 1915 A.B.C. after a mileage which cannot be exactly stated, as the speedometer was out of commission for a long period; but, roughly speaking, the engine has done a total of about 11,000 miles, and the distance since the last decarbonisation is about 2,700 miles. There is not the faintest trace of wear in the connecting rod bearings, either big or little; and the piston rings are, if anything, too free in their grooves. The detachable combustion head considerably facilitates the problem of dismounting the cylinders of a flat twin without disturbing the crank case; but it does not solve the question of rendering certain nuts accessible, to wit, those which hold down the cylinder base. Very careful frame design is necessary if an ordinary spanner is to reach these nuts, and this is about the only practical detail which seems to have escaped Mr. Bradshaw's attention.

Removing Self-cottered Valve Springs.

THE friend who assisted me in the above job had not previously struck the type of valve spring which dispenses with a cap and cotter, the tip of the final coil of the spring passing through a hole in the valve stem to form its own cotter. I saw him musing on the proper method of extricating this spring, and allowed him to make a few unsuccessful experiments before showing him the approved way, which is ridiculously simple. (Take a pair of pliers, and press the top coil—on the side opposite the cotter end—towards the valve stem; the power of the spring itself will then jump the cotter end out.) However he had the laugh of me on the return journey. He waited reverently aloof to watch the simple tip by which I should coax the tip of that spring back into the hole of the valve stem; and I had to confess that if there is a golden rule for this awkward little job, I am ignorant of it. It is not particularly difficult, even with a very strong spring; the spring is easily compressed into position, *e.g.*, by slipping a drilled washer over it and bearing down on the washer with a tube spanner or other hollow tool; and when the spring tip once enters the hole, it snicks home instantly. But this plan certainly looks clumsy compared to the deft touch by which the spring can be freed; and there is probably a simple workshop tip for the job? An obvious merit of this system on an o.h.v. flat twin is that it exposes the valve spring to the cooling draught, whereas a cap and cotter would shield it, otherwise it has no particular advantages.

Why Flat Twins Start Easily.

ON withdrawing the cylinder of a flat twin any lubricating oil remaining in the cylinders will be found lying in a little pool along the bottom of the cylinder; the upper circumference of the piston and the cylinder will feel, but not look, greasy. According to many people, the absence of an encircling film of congealed oil is the main cause of the very easy starting for which these engines are famous. On the other hand, one would expect the lubricant to drain clean out of the whole of a vertical cylinder, leaving just enough greasiness on the walls to lubricate the piston until more oil gets splashed up; still, in this case, the oil drains into a circular catchpit turned round the edge of the crank case baffle plate, and a lot of it is thrown up into the cylinder again at the first dip of the piston. I am strongly inclined to think that the narrow clearance of internal flywheels is the main source of oil-clogging and stiff starting on the standard type of vertical single and V twin. There are, of course, limits to the size of the crank case, and those limits are none too generous for the flywheel designer.

Graphite as an Engine Lubricant.

AN ordinary motor cyclist is in no position to judge of the value of experiments which only affect the efficiency of an engine by a very small percentage. His tests must be conducted on the open road, and such variable factors as grades and weather and surfaces interfere with any attempts at precise accuracy. Scientific tests are only possible with the aid of a laboratory and special apparatus. Consequently, I have always wished that some professor would carry out a full range of experiments with graphite as an auxiliary lubricant, alike for engines and transmission, and give us some authoritative statements on the point. My own interest in the matter dates from the accidental purchase of a tin of Oildag, a mixture of deflocculated graphite in oil. I used the bulk of this sample in ordinary running, and formed the opinion that it had improved the running of my engine, and that it produced a perceptible economy in lubricating oil. But the final experiment made a greater effect on my mind. I happened to take an engine down, and when I was about to smear the cylinder walls with oil, prior to replacing it on the crank case, it occurred to me to use some oil which had been oil-dagged. The first hundred miles covered after reassembling that engine were undeniably the best running it ever gave. And the nett results of these haphazard experiments were to suggest the impression that graphite must be a splendid cylinder lubricant, but that present methods of applying it are probably imperfect.

COMBINED VALVES.

A REVIEW OF VARIOUS COMBINED EXHAUST AND INLET VALVES OF EUROPEAN DESIGN.

FROM the publication of an illustrated description in *The Motor Cycle* of a recent patent one may conclude that inventors are again paying attention to the combined inlet and exhaust valve. Consequently it might perhaps be of interest to readers—particularly students of design—to review a selection of these valves as they have made their appearance on different occasions.

The proposition of the concentric valves is exceedingly attractive at first sight, and in the early days of aviation they received particular attention from aero engine designers. In those days the demand for particularly light engines was very acute (not that this question is less prominent to-day), because high-powered engines of extremely light weight were practically non-existent. A reduction of weight was then sought for in some unconventional designs involving sometimes radical departure from orthodox practice. It was not then realised that efficiency combined with high engine speed could have such an enormous effect on the engine weight per output.

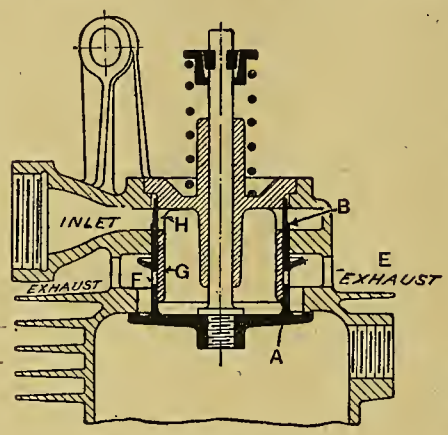


Fig 1.—Esnault-Pelterie valve.

One masterpiece of this class of design is to be found in the rotary Gnôme engine; although the efficiency is not marked as to its fuel and oil consumption, it scores by clever and ingenious departure from standard practice, and we cannot fail to admire the keen hand of the creator of this engine, which opened the way to practical flying on a larger scale than was at one time supposed to be in any way possible.

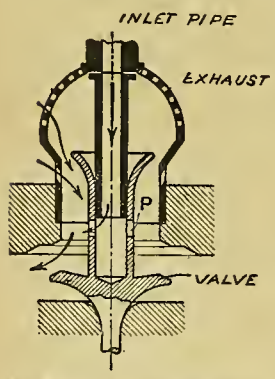


Fig. 2.—The Farcot concentric valve, inlet period.

At about the same time the combined valve of R. Esnault-Pelterie made its appearance, and was used on air-cooled engines of the same designer. Fig. 1 illustrates this type of valve. The valve A is mounted in the cylinder head, co-axial with the cylinder, and is made of exceptionally large diameter. To this valve is attached a sleeve B, having an annular projection E forming a second valve. In this sleeve are ports F cut all round, and into the sleeve projects the portion G of the valve guide with ports cut at H. The operation can easily be followed if it be remarked that during the exhaust stroke the push rod opens the valve only a little way, and, as the suction stroke immediately follows the exhaust stroke, the valve is opened further, so that the flange E covers the exhaust passage, while B uncovers the ports H, and simultaneously the ports F are uncovered, allowing the mixture to enter the cylinder. It may be said here that the sole object was not directly to save weight, but, as air-cooling was thought to be essential for a light aero engine, difficulties arose in keeping large exhaust valves cool. For this reason the incoming charge was employed in these valves to keep the exhaust valve cool, so rendering the use of a large valve possible. With most of these engines enjoying a free exhaust into the atmosphere the development of the combined valve was considerably assisted.

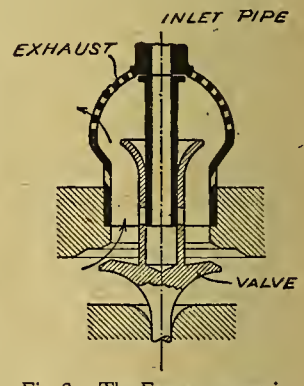


Fig. 3.—The Farcot concentric valve, exhaust period.

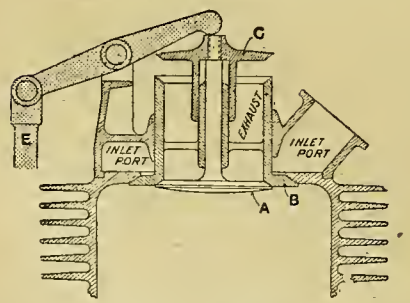


Fig. 4.—Closed valves.

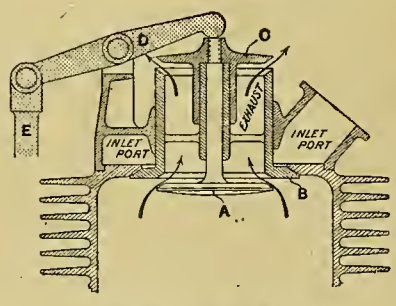


Fig. 5.—Exhaust period.

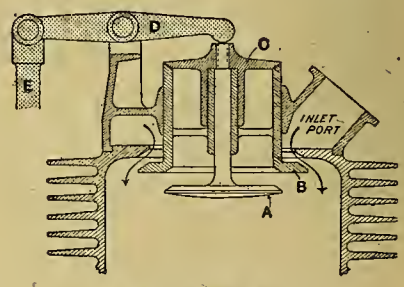


Fig. 6.—Inlet period.

Combined Valves.—

It will be noticed that in this valve the exhaust and inlet ports are open simultaneously during a certain period, which might interfere with the efficiency of the engine. At the end of the suction stroke, during the closing period of the valve, a communication of short operation with the exhaust ports is again established.

The Farcot Valve.

Another combined valve is that used by Farcot and illustrated in fig. 2 and fig. 3. The drawings are sufficiently explicit to show its operation. Fig. 3 illustrates the exhaust period and fig. 2 the inlet period. It will be noticed that in this case no attempt has been made to close the exhaust ports; on the contrary, the main air supply is drawn in from the atmosphere through the exhaust ports while presumably a very rich mixture is passing through the inlet pipe and the ports P.

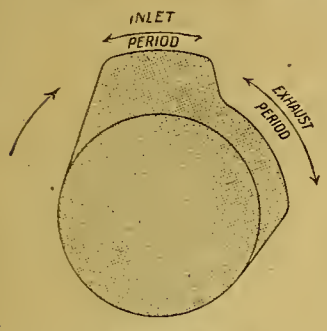


Fig. 7.—Cam profile.

A Simple Concentric Valve.

With the idea of overcoming the disadvantage of a great overlap during the change from exhaust to inlet period the combined valve illustrated in figs. 4, 5, and 6, has been designed.

Fig. 4 represents the closed position, A and B being the main valves, while C represents an auxiliary valve. the whole operated by the rocker D and rod E. Fig. 5 illustrates the exhaust period; the burnt gases, while escaping, pass the two valves A and C. As the rocker further depresses the valve, the auxiliary valve C closes, and any further downwards movement of the rocker opens valve B (see fig. 6), thus making a communication between the inlet ports and the cylinder. When regaining the closed position (fig. 4), we evidently have again to pass for a somewhat short period through the position as illustrated in fig. 5.

Valves of the previously described pattern are operated by cams having a profile as illustrated in fig. 7. A combined independent set of valves is employed in fig. 8, which represents such a valve used by Pipe (Brussels). A represents the one valve, while B represents the other valve with a sleeve attached to it, forming the annular space C inside for the inlet and outside D for the exhaust. Two independent rockers E and F operate the valves from independent cams. Each valve is provided with a spring to keep it on its seating.

As a matter of interest a similar valve mechanism is illustrated in fig. 9 as applied to a water-cooled cylinder; however, the method of securing the valves independently to their respective seats is not quite clear.

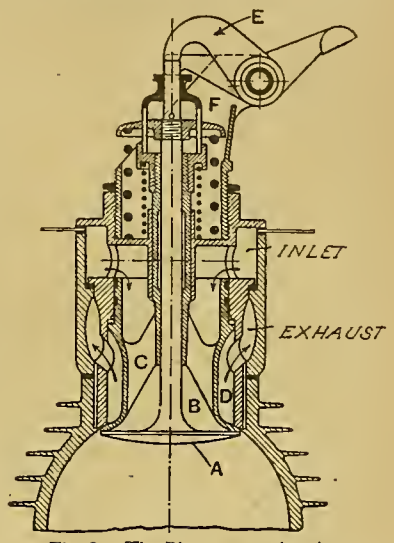


Fig. 8.—The Pipe concentric valve.

Pros and Cons.

The advantage of these combined valves is greatest when used in conjunction with air-cooled engines, and therefore it is not surprising to see further attempts made to use them on motor cycle engines. The valves can be of ample size and in the centre of the cylinder head, having a simple operating mechanism, and effective use is made of the cooling effect on the exhaust valve of the fresh incoming charge. Such valves are bound to be heavier than the present type, and difficulties in the case of high speed work are likely to occur.

However, it is certainly well worth while to give the idea fresh consideration as an extremely simple, neat, and effective design is by no means out of the question, and, in view of recent knowledge gained in high speed motor engineering, might well repay the trouble expended upon it. An extremely simple cylinder barrel would result from such a design; this might be an all-steel cylinder with fins turned all over. or a steel cylinder barrel with die cast aluminium fins cast round it, or even copper fins in separate rings shrunk on the barrel.

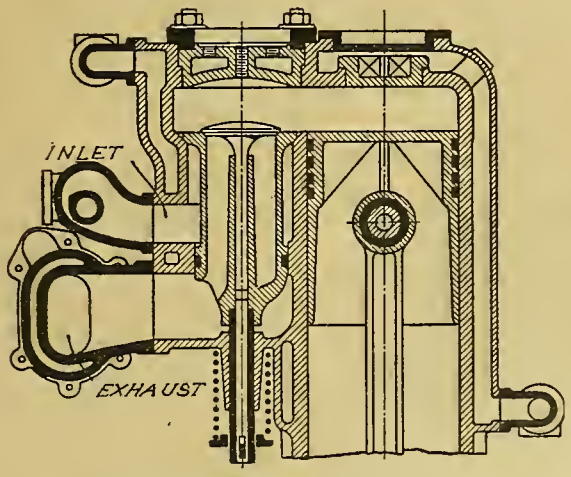


Fig. 9.—The Parsons combined valve.

Any of these cooling devices might be incorporated with little, if any, additional cost of production. Quite apart, however, from simplifying the matter of more efficient cylinder design, the principle is to be recommended on the grounds that the heat is evenly distributed over the cylinder head, thus eliminating the "hot side" defect. The heat dissipated from the exhaust valve is, moreover, put to good use, since it is imparted to the incoming charge, thus assisting carburation.

G. FUNCK

OVERHAULING A 1914 6 h.p. ZENITH.

How the Value of a Second-hand Machine was Enhanced at the Cost of Five Shillings.

THE writer has been using the 1914 6 h.p. Zenith here illustrated continuously since 1914, in all weathers, with and without sidecar, and cannot speak too highly of its merits.

Towards the end of 1916, with a view to sale, the machine was subjected to a thorough clean up and overhaul. All "gadgets" were removed and the machine given a good rub down. The exhaust pipes, magneto, belt, etc., being removed, the engine and countershaft were slipped out of the frame in unit by withdrawing three bolts—one in front of the engine and two behind. The frame, wheels, etc., were all dismantled, well cleaned with rags, enamelled parts polished with furniture polish, and chipped parts painted with "Robbialac." Steering head, ball races, etc., were cleaned with paraffin and well oiled.

Attention was now turned to the engine, which was well cleaned with a stiff brush with paraffin, followed by petrol; then the cylinders were detached, deposit removed, and valves ground.

Cleaning the Engine.

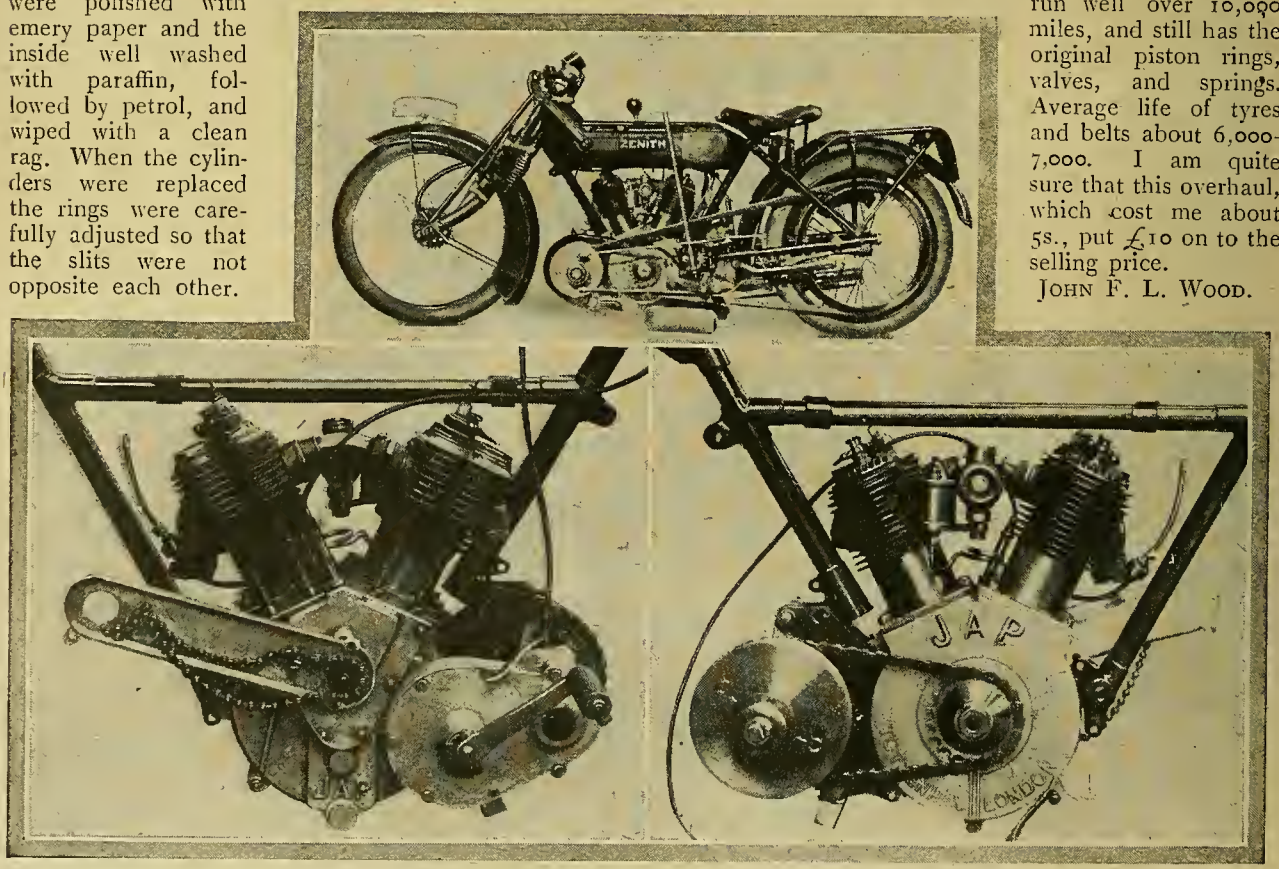
When cleaning cylinder head, care should be taken to wrap a clean rag round the connecting rod and over the crank case, in order to prevent grit entering the latter. The piston rings were next removed and the grooves cleaned. The machined parts of the cylinders were polished with emery paper and the inside well washed with paraffin, followed by petrol, and wiped with a clean rag. When the cylinders were replaced the rings were carefully adjusted so that the slits were not opposite each other.

Turning now to the transmission, the countershaft chain was soaked in paraffin, then in heated tallow. Before replacing the second cylinder the crank case was half filled with paraffin, and drained out when the engine was replaced in the frame. When reassembling, the crank case was first fixed in the frame, then the other parts built up in order. Exhaust pipes were scraped free of all burnt-on oil and mud and brightened with emery paper. It is a good tip to brush engine oil into the bright parts of the cylinders to prevent rust. It was the first time I had timed a magneto, but by following the instructions in any handbook I found it quite an easy job.

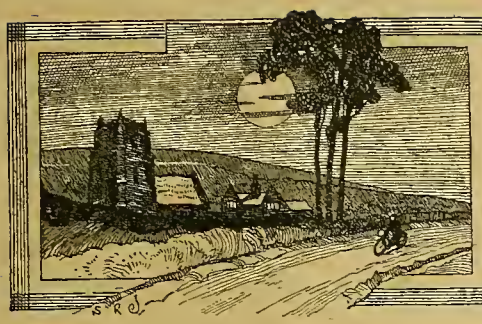
Final Touches.

When completely reassembled the machine looked almost new, and started at the second kick. It should not be forgotten to pump about four charges of oil into the crank case and revolve the engine after draining off the paraffin. The rear plug sooted two or three times until the paraffin was got rid of, as might be expected. All possible places for air leaks were bound with insulation tape. The machine had always been treated kindly, and immediate attention to the small things that go wrong has always saved me from serious trouble. I could get over 80 m.p.g. solo and 65 m.p.g. with sidecar. The machine has run well over 10,000 miles, and still has the original piston rings, valves, and springs. Average life of tyres and belts about 6,000-7,000. I am quite sure that this overhaul, which cost me about 5s., put £10 on to the selling price.

JOHN F. L. WOOD.



Stages in the overhauling of a 1914 pattern 6 h.p. Zenith, which has run well over 10,000 miles. The top photograph depicts the machine after the rejuvenating process. The lower views show how the gear and engine can be dropped as a unit from the frame.



BENZOLE AND ITS PRODUCTION.*

Some Facts and Figures relating to an Interesting Process.

THE word "benzole" is used in commerce to represent the commercial mixture of benzene and toluene.

Benzene has the following properties: Specific gravity 0.881 at 60° Fahr. Flash point below ordinary temperatures. Extremely inflammable, burning with a dense smoky flame. Readily dissolves fats and resins. Boiling point 81° C. Its chemical formula is C_6H_6. Benzene is most important in industry. The whole of the aromatic compounds are derived from it. Benzine must not be confused with benzene, for it is a compound of an entirely different series of hydrocarbons, derived from petroleum. At the present time the Government is taking all benzene produced to be converted synthetically into phenol, which is again converted into picric acid, a high explosive.

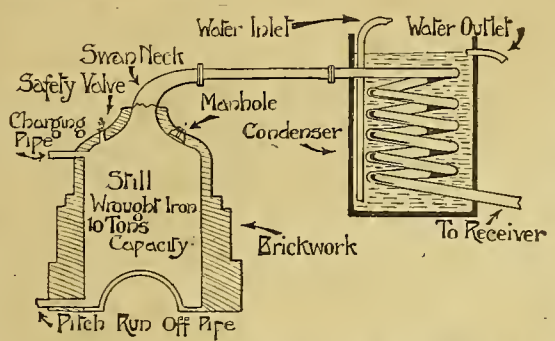
Toluene, the other compound found in benzole, has a specific gravity of 0.874 at 60° Fahr. Flash point also below ordinary temperatures and extremely inflammable. Boiling point 110° C. Chemical formula C_6H_5 (CH_3).

Toluene is being converted into T.N.T. or tri-nitro-toluene by nitration with nitric acid. T.N.T. is one of the highest explosives known. The Ministry of Munitions is accepting two qualities of benzole—one yielding 95% at 90° C. on distillation in a Wurtz flask connected with a Liebig condenser; the other, called pure benzole, yielding 90% of distillate between 81° C. and 81.5° C. This latter quality is practically benzene.

Coal Tar Distillation as a Source of Benzole.

English gas tar contains approximately 1% by weight of crude benzole. By crude benzole is meant a benzole giving 65% of distillate on distillation in a straight retort up to 100° C.

The tar is pumped from a large storage into stills having a capacity of twelve tons. Heat is applied underneath the still, which has a concave bottom, by means of a coal fire or by gas. Water is driven off together with an oil lighter than water, and these are condensed by means of a cast iron worm having several laps immersed in water. When these light oils and all the water have been driven off a separation is made and the succeeding fractions run into different storage tanks. This first fraction of light oils and water is called First Runnings, and from this all the benzole, previously contained in the tar, is obtained.



The still (on left) contains the tar from which light oils are extracted. It is from the latter that benzole is obtained.

Into a still identical with a tar still a charge of First Runnings is pumped. Heat is applied and the vapours formed pass up a tower, which is so constructed as to allow only the lowest boiling of the vapours to pass over the top to the condenser. This separation of different boiling point vapours, and consequently of different compounds, is obtained by a series of restrictions in the tower upon which films of condensed vapours gather. Thus the rising vapours are continually subjected to a condensing process in which only the light boiling point vapours pass over by reason of their being more difficult to condense.

The product of this fractional distillation is "washed" to extract the sulphur compounds thiophen, carbon-di-sulphide, etc. The washing is done in lead-lined receptacles of various capacities and designs. All have, however, an Archimedean screw or other type of propeller driven by some motive power for agitation. Sulphuric acid is used in this washing to the extent of about 8% to 9% by weight. This acid is used in two or three distinct agitations. It settles down after about one hour, and is then run away to waste by means of a valve at the bottom of the washer.

Then follow two water washings which, after having been run off, are followed by ½% of 20° Twaddle (or 1.100 specific gravity) caustic soda solution. This soda is to neutralise any acid in the crude benzole, which is now fractionally distilled, sometimes twice where pure products are manufactured. The fractional distillation, previously described, is further assisted by a dephlegmator, which is merely a condenser through which the vapours have to pass after leaving the column. Any vapours condensed here flow back into the still, whilst the uncondensed pass on to be condensed in an efficient condenser and thence to the receiver. Working at the rate of about fifty gallons per hour the final products are produced.

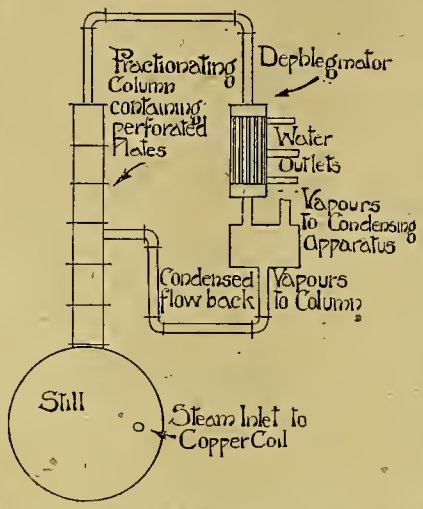
Coke Ovens as a Source of Benzole.

Coal contains from one gallon of crude benzole per ton in South Wales to 3½ gallons per ton in the North of England. By far the largest amount of benzole

* This article has been submitted to and passed by the Press Censor.—ED.

Benzole and its Production.— is now produced at coke ovens, where coal, of the bituminous variety, is subjected to dry distillation in horizontal ovens built of refractory material having a general measurement of 30ft. long, 5ft. 6in. high, and 20in. wide. The ovens are built in blocks of fifty, and between each two are arranged flues in which gas is burnt to supply the heat for the coking of the coal. Each oven holds approximately eight tons of coal, and the period for complete coking varies from twenty-four to forty-eight hours.

In the coal used for coking is found from 20% to 35% of volatile matter. This means roughly that the rest of the percentage is coke or practically pure carbon. Now this volatile matter is driven off by the intense heat of the oven and rises as gas into a collecting main on which a suction is exerted by an exhauster engine. The gas is drawn through a series of coolers and tar extractors until, when it passes the exhauster, it is under pressure. It is now forced through ammonia scrubbers in which water is used as the ammonia absorbent. Following these ammonia scrubbers are the benzole scrubbers. These are cast iron towers sometimes 60ft. high or more, packed with wooden grids. Creosote oil, a product of tar, is pumped down these, and the gas being forced up comes into intimate contact with it. The creosote which absorbs benzole, and mixes with it in any proportion, extracts the benzole vapours contained in the gas, and flows to the bottom of the scrubber. By a series of pumps and seal pots the creosote is obtained containing 3% of crude benzole, and is run into the "benzolised oil storage."



The type of still used in the rectification of crude 65% benzole.

This benzolised oil is pumped to the benzole plant, where a continuous process is in operation for taking the oil as it is benzolised. Sometimes by a pump and sometimes by force of gravity the oil rich in benzole is passed through a reheater in which are cast iron coils. Through these steam at about 90 lb. pressure is passed. The oil is consequently heated from perhaps 20° C. to 110° C. This hot oil next flows into the still proper, in which are steam coils and supplies of direct steam. The benzole by reason of its lower boiling point is driven off whilst the hot creosote (debenzolised oil) flows out and is cooled for further use in the scrubbing towers. The condensed benzole is termed crude benzole, and gives about 65% on distillation up to 120° C.

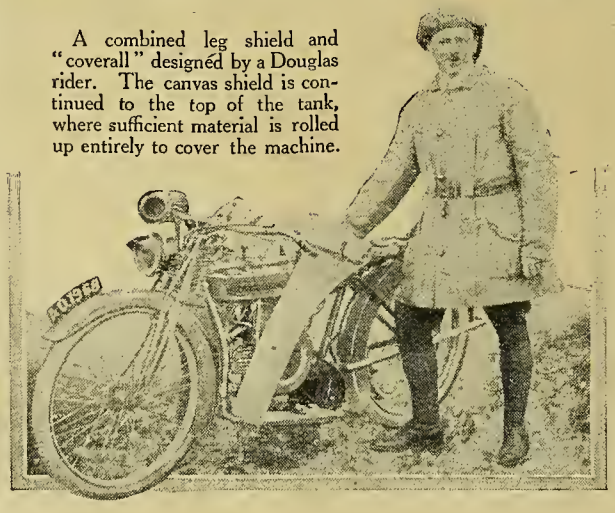
During the operations in a crude benzole plant great use of the heat is made by means of heat interchangers. The crude benzole is treated in much the same way as already explained in coal-tar distillation. At small gasworks, where it has not been considered worth while to erect a benzole recovery plant, the gas is subjected to a slight scrubbing with tar. This tar has its benzole contents considerably raised, and thus is of greater value to the tar distiller.

"GASS TARR."

A Combined Leg Shield and "Coverall."

A Douglas Owner's Fitment for "All-weather" Riding.

THE neat leg shields shown in the accompanying photograph are the work of Mr. J. Herbert, Nymphsfield, near Stonehouse, and appear to be particularly well adapted to his neat little solo mount. The shields are made of wire and canvas, the fabric being painted the same colour as the machine. They are curved so as to scoop the draught on to the cylinder, and the two rolls resting on the top bar are used for covering the machine when it is left standing outside in the wet. One roll is pulled over the handle-bars, while the other extends backwards over the saddle, thus providing very adequate shelter.



A combined leg shield and "coverall" designed by a Douglas rider. The canvas shield is continued to the top of the tank, where sufficient material is rolled up entirely to cover the machine.

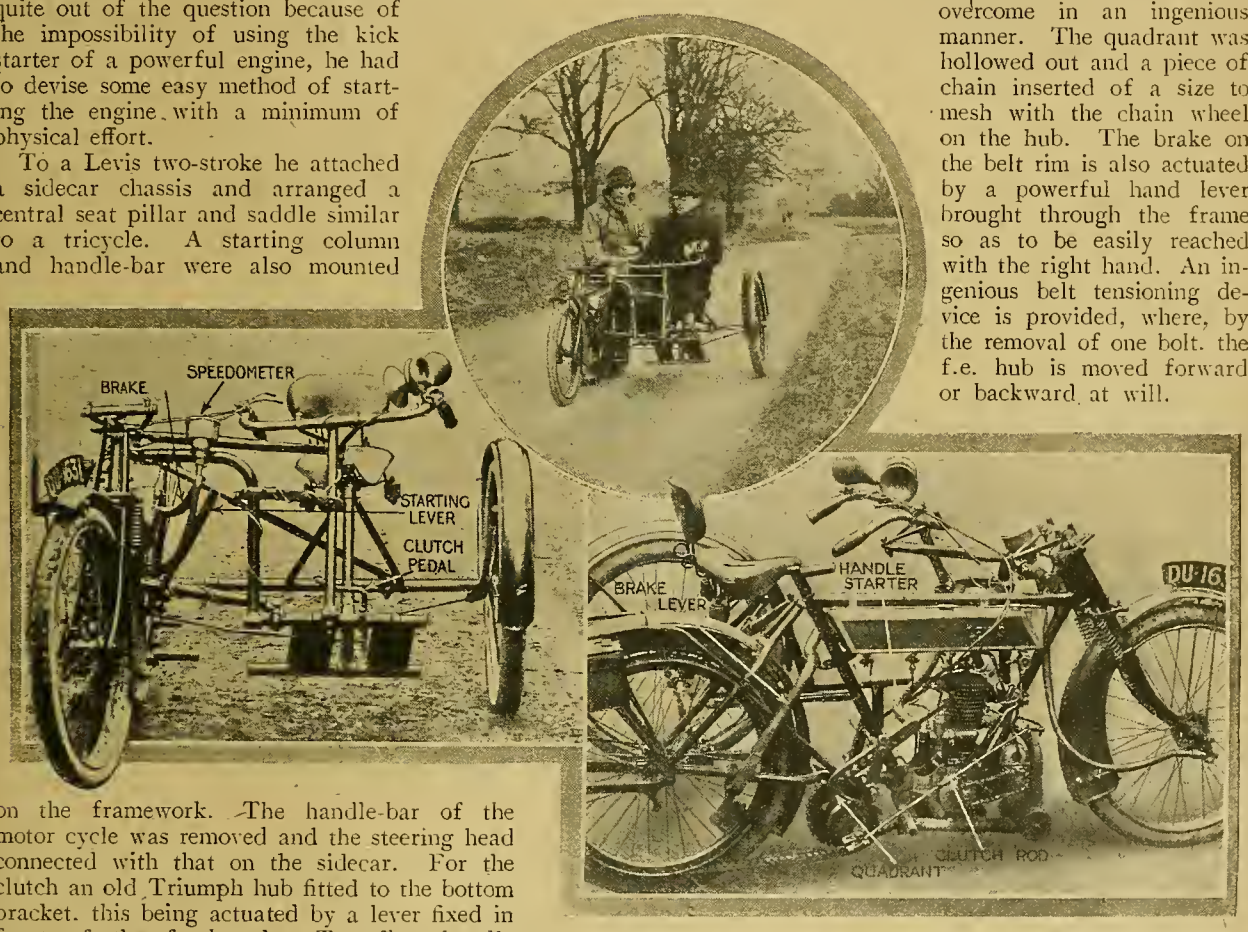
The shield has been in use two years, and Mr. Herbert states that he would not be without it. By loosening off three wing nuts the whole device can be bodily removed. There is also a metal shield under the engine, which helps further to keep the machine clean and the rider dry and warm.

This arrangement would appear to have the merits of lightness and efficiency, and is certainly one of the best home-devised combination shields we have as yet come across. It may be added that shields of this kind, though perhaps not so neat in appearance as metal ones, do not imprison the noises of the engine, while they have the additional feature of lightness in their favour.

A FEATHERWEIGHT RUNABOUT.

A CONVERSION of the most novel description was recently brought to our notice. The owner, who has an infirmity which precludes him walking any great distance, required a stable vehicle exceptionally easy to start and manipulate, and easy to mount. The ordinary type of motor cycle being quite out of the question because of the impossibility of using the kick starter of a powerful engine, he had to devise some easy method of starting the engine with a minimum of physical effort.

To a Levis two-stroke he attached a sidecar chassis and arranged a central seat pillar and saddle similar to a tricycle. A starting column and handle-bar were also mounted on the framework. The handle-bar of the motor cycle was removed and the steering head connected with that on the sidecar. For the clutch an old Triumph hub fitted to the bottom bracket, this being actuated by a lever fixed in front of the footboards. To effect handle starting the chain wheel of the f.e. hub is retained, and engages with a quadrant as shown on the right-hand side of the machine, the handle extension being carried through the frame to the opposite side, where it can be conveniently operated from the saddle. Not having the use of machine tools adapted for cutting teeth on a quadrant for the kick starter, the difficulty was overcome in an ingenious manner. The quadrant was hollowed out and a piece of chain inserted of a size to mesh with the chain wheel on the hub. The brake on the belt rim is also actuated by a powerful hand lever brought through the frame so as to be easily reached with the right hand. An ingenious belt tensioning device is provided, where, by the removal of one bolt, the f.e. hub is moved forward or backward at will.



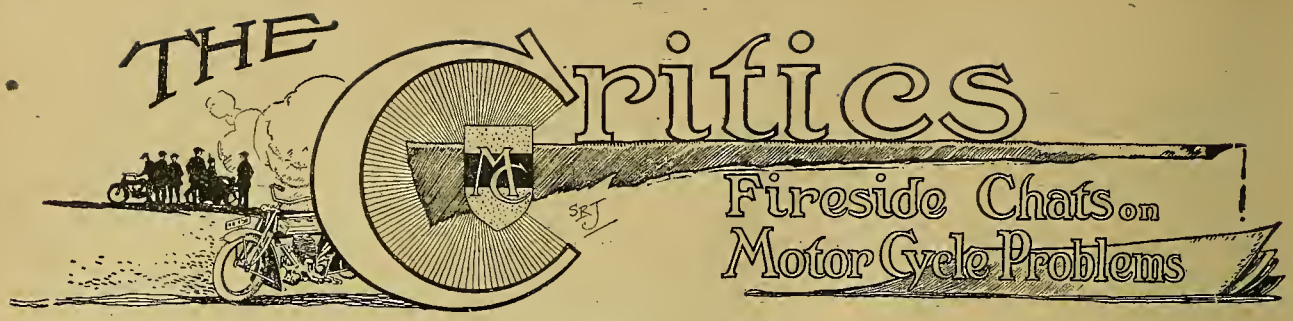
The featherweight Levis runabout described on this page. In the circular view it is being used as a two-seater. (Top) The Levis runabout on the road. (Lower) Detailed views of the chassis.

RUNNING ON PARAFFIN.

RESPECTING the short article entitled "Petrol or Paraffin?" (page 298, issue of April 5th), the writer, Mr. Leonard R. Jones, has since made further experiments which have resulted in his discovering that the air intake can be overheated, a fact which causes pre-ignition. To remedy this a slide has been put in the side of the air intake box, and the compression of the engine has been reduced by fitting a distance ring between the cylinders and the crank case. It has also been found that the method described of heating the paraffin in a separate chamber is not altogether satisfactory, as the heat was, to a large extent, radiated away by the pipe to the float chamber and the chamber itself. An outer casing was therefore made for the float chamber, into which a pipe leading from the exhaust conveyed the hot gases round and to the bottom of the float chamber—a device which was found to effect a great improvement.

On the road the initial explosion from paraffin appears to be more violent than petrol, but perhaps with less expansive effect, while the speed on the level and down hill has undoubtedly been increased by the use of this fuel, but its pulling effect on a hill is less than with petrol.

Mr. Jones is of the opinion that this is caused by the charge being attenuated by the heat and by the engine itself overheating. He considers that if these difficulties could be eliminated better results all round could be obtained with paraffin.



CONCERNING KIT.

THE Novice, having bagged the most comfortable chair, was luxuriously spreading himself out on the subject of necessary spares and kit. "On one occasion," he stated, "I was compelled to take delivery of a new machine at the works—the makers characteristically having forgotten the date of delivery—and start right off on my fortnight's holiday. The question of spares, etc., never occurred to me, but I had not gone twenty miles when I picked up a puncture, and then discovered I had no repair outfit. This little affair wasted nearly half a day, and a week later a slight chain adjustment necessitated a half link—no spare links! On the return journey a nut came off—no nuts! I finished the tour by train, and one can imagine my first impressions of that particular machine! Personally, I consider it the height of folly for manufacturers to risk losing the good faith of a new buyer for the sake of a few shillings, as in this case."

"Hear, hear!" rumbled the Journalist. "I agree with you absolutely. One pays £75 for a machine, and is then informed that a spare valve and chain parts—which everyone wants—will be seven shillings extra! I call that drawing it to a pretty fine point, and after buying a new machine it always takes me a week or so to acquire the little extras essential for serious touring—— "

Accommodation of Tools.

"And then," interposed the D.R., "one has nowhere to put them, the makers having provided only for the inadequate outfit they themselves throw in."

"Just my point," corroborated the Novice, slapping his capacious waistcoat quite vigorously. "If only they would consider our demands in the way of necessary gear we should then get decent provision for carrying it, instead of having to tie it to a machine wrapped in American cloth! It requires no little ingenuity to stow away all the seldom required but indispensable spares so that they will not perish, rattle, or drop off."

"But," put in the Manufacturer, "there are several firms who provide everything—even down to a bit of copper wire."

"Wish you'd name one," stated the D.R., "I would like to patronise it—if only for its enterprise."

The Manufacturer named the Rudge. "The Rudge kit is splendidly fitted out," he asserted, "which I attribute to the fact that the managers are themselves keen and practical motor cyclists."

There was an awkward silence, finally broken by the popping of a cork. "Well," said the Journalist, cheering up a bit, "the most satisfactory experience I have had was in connection with the cheapest machine I ever bought—a four-stroke, costing £26. All necessary spares were included, and when I wrote and told the makers they had omitted to provide a certain spanner, they despatched me a whole pile of kit by return. Good heav—— "

"It's just that whole pile of kit which gets on my nerves," interrupted the D.R. "I always find that, by judicious selection, half the spanners and keys can be dispensed with. One can do a lot with a B.S.A. and small King Dick, and I wish makers of tools would remember that corners and sharp edges not only take up room, but that they ruin any kit roll in creation."

Quality, not Quantity.

The Journalist said the D.R. was quite right, at which the discharged soldier felt privileged to collar a glass. "One does not require a huge roll of thoughtlessly-selected tools, but a few good, judiciously-selected ones," announced the man of letters. "I generally give all the freak instruments to the village cycle agent, which pleases him immensely and does no one any harm. In the end my kit roll occupies half the previous space, and can be snugly and neatly packed."

"You take some satisfying," observed the Manufacturer, drily. "A moment ago you were grumbling about an insufficiency. What we really want is standardisation of nuts and bolts.

"And as for judicious selection," added the Novice, waiting for the Manufacturer to pass the soda water, "we are not all capable of exercising it. Personally, I never discard anything supplied with the machine. Half of it I never use—don't even know what it's for. It eats holes in my kit roll and fills the tool bags with fluff—yet I keep on carrying it. I think those queer-shaped things ought to be labelled."

Spoiling a Ship, etc.

The D.R. strove to find an adequately sarcastic reply, but, failing, he turned to the Manufacturer. "Returning to spares," he said, "surely manufacturers are not down to a few shillings when it comes to a cheque for sixty or seventy pounds? It seems to me that it would be a splendid talking point to advertise a machine as complete and ready for the road, instead of leaving us to sort out our tools and buy spares, lamps, speedometer, etc., ere we can start on a tour."

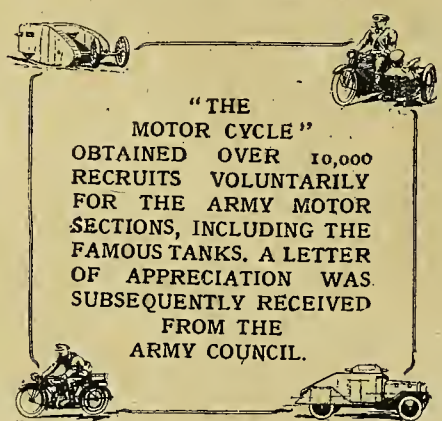
The Manufacturer blew forth a huge cloud of smoke. "I believe in supplying adequate kit and necessary spares," he stated, "but whatever we do, half you fellows will still have your grumbles. As regards accessories—these the rider must select for himself. We could never satisfy all. Some riders do not want accessories; others choose to transfer them from machine to machine. Nearly everyone has his fancies. It would be impossible to satisfy all, and, moreover, we are not out to grab the accessory dealers' trade."

An Excellent System.

The Journalist now agreed absolutely with the Manufacturer. "But it might be done on the same lines as the Enfield people do it," he added. "That is, by having a standard vehicle on sale and charging extra for the same machine fully equipped with accessories—Watford speedometer, electric or gas lighting set, and so on. This system is excellent, because the accessories should be in general harmony with the machine, and no one is so well able to select them as the manufacturer.

"As for tools," continued the Journalist, "I think we have no real grounds for complaints. If the experienced man gets too much and chooses to sort it out, that is his show, and a matter of individual tastes. We cannot grumble at the makers if, in their eagerness to give us all we want, they give us too much; but what we really want is a good bag for spares, situated where it won't rattle excessively. It is a trivial point, anyway, so—kindly pass the cigars!"

Here the conversation switched off into a discussion as regards the respective merits of gas and electricity for lighting purposes, a discussion which carries us into other regions, and which, therefore, must be left for another week.


"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

CURRENT CHAT

TIMES TO LIGHT LAMPS.

SUMMER TIME.

April 12th	... ...	8.18 p.m.
,, 14th	... ...	8.21 ,,
,, 16th	... ...	8.25 ,,
,, 18th	... ...	8.28 ,,

The National War Funds.

At the week-end the principal war funds stood as follow :

The Prince of Wales's Fund (distributed £3,572,508)	£6,100,029	0	0
The British Red Cross Fund ..	6,451,990	9	11
Tobacco Fund	127,845	0	0

Easter Weather.

Friday and Saturday were fine almost everywhere, but on Monday there was thick snow practically throughout the North Midlands.

In the Peak District.

In Chatsworth Park on Easter Sunday we counted over a dozen motor cycles and sidecars during a saunter through the beautiful grounds. At Haddon Hall, instead of the field full of cars and motor cycles, there were two cars and one sidecar.

The State of our Roads.

Road deterioration is most pronounced, particularly in munition areas. There will be work for thousands of returned soldiers "after the war," before the surfaces will be returned to their former state. But improved methods of road making, to render them dustless and "skidless," are sorely needed. Here is a problem for road engineers.

A Discovery.

During a run to the South of England this Easter a member of our staff, riding a two-stroke lightweight, was unable to use his low gear owing to a disagreement with the Bowden control. Nothing daunted, the little machine was ridden through the Monmouthshire hills, and, though the owner had ridden it for nearly a year, he was now completely astounded by its climbing capabilities. Hitherto the mode of procedure was to change down and keep up the "revs," but now it was discovered that the little machine would climb veritable mountain sides on its top gear. Why, then, the complication of a gear box?

Why?

The question was answered on the return journey, when a head wind was encountered. Given the least wind resistance, the little engine could not tackle the steep gradients. It was further noticeable that this excess of low speed, top gear, work very rapidly increased the carbon deposit.

Easter Knuts.

No Easter eggs this year—that is, the sort made of sugar, and precious few Easter knuts! The unfortunate youth touring on a motor cycle in these days tries to look as little like a knut as possible—in fact, he sneaks about unostentatiously.

Solo Mounts.

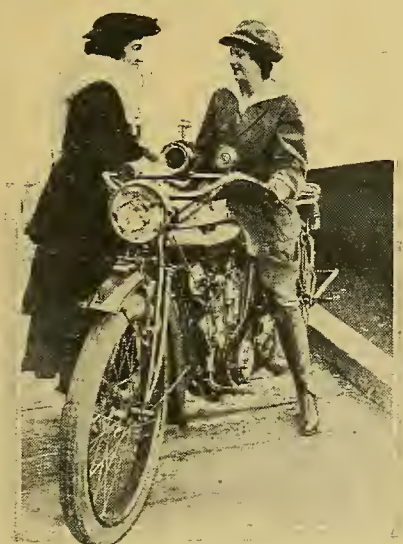
It was particularly noticeable that during the festive Easter period almost the only solo mounts to be seen in country districts were of the lightweight order—no luxurious solo machines.

The Big Twin.

The only big twin solo we came across was on the road between Warwick and Tewkesbury. The "rider" was pushing it—owing to a seized engine. The seized engine was due to a 50% paraffin mixture—in spite of a 50% overdose of oil. Paraffin users, take notice! Keep your engine smoking and avoid seizures.

Few Sidecar Outfits.

Most of the sidecar outfits seen on the road—and these were few—were of the family 'bus order, overloaded and generally underpowered. Incorrect alignment and the smell of badly-carburetted fuel were the common order among these typical Bank Holiday outfits.



An enthusiastic Indian rider, Miss Mary White, of Los Angeles, Cal., and the "Goodrich Girl," whose calling is to pose for photographs to be used in advertising Goodrich tyres.

SPECIAL FEATURES.

COMBINED VALVES.

BENZOLE AND ITS PRODUCTION.

MOTOR CYCLISTS AND NATIONAL SERVICE.

Petrol Stocks.

On this score we questioned one or two garages at which we stopped as to their stocks of spirit, and were always assured that they had ample if we had the necessary permit to buy it.

The Cautious Motor Cyclist.

We observed that many motor cyclists at Easter had taken the precaution to carry a spare tin of petrol on the carrier, but there was really no need apparently, as the above paragraph proves.

Decrease of Motor Vehicles.

There was a noticeable decrease in the number of motor vehicles on the road, so many devotees of the motor cycle now serving in one or other of the Services. The lack of petrol also had its effect.

Not Economy!

In spite of Government exhortations to economise, many munition workers, for lack of petrol, had to pay a good deal more in train fares than the running of their motor cycles would have cost, had there been no restrictions to the sale of petrol.

No Competitions in Ulster Centre.

The decision to hold no competitions until the termination of the war was reaffirmed at the A.G.M. of the Ulster Centre of the Motor Cycle Union of Ireland. Mr. E. J. Mitchell is the new president.

Carbide Running Short.

"Coming events cast their shadows before," and if the war is not over before next winter such a thing as the "carbide permit" as companion to the petrol licence is not at all improbable. There is a shortage of calcium carbide, and the Ministry of Munitions has written to all known users of carbide in bulk drawing their attention to the urgent necessity of exercising the utmost economy in the use of calcium carbide. It is suggested that every opportunity should be taken to utilise substitutes, whether for use as an illuminant or for oxy-acetylene welding, "as it is only by such means that the serious shortage threatened can be averted."

Benzole—After the War.

An article in this issue seems to indicate that there will be an abundant supply of benzole after the war. Let us hope that the benzole-producing possibilities of the country will be maintained and developed, thus rendering the nation independent of yet another hitherto imported necessity.

Motor Volunteers—A New Corps.

A Motor Volunteer Corps is being formed in Hull and the East Riding, and so far there has been a ready and patriotic response. The Sheriff of Hull, Mr. Arthur J. Atkinson, J.P., himself a keen motorist, is undertaking the organisation, and will be at the head of the corps. We are informed that a number of motor cyclists are required.

Reversing the Direction of Rotation of a Magneto.

We have been requested by a well-known firm of British magneto manufacturers to mention a fact of which many motor cyclists may not be aware, namely, that it is not possible to alter the direction of rotation of a 50° V-type magneto. The special construction of this magneto machine to give the correct angle of firing is such that it cannot possibly be run in the opposite direction by fitting a different contact breaker.

Easter Road Conditions.

We are informed by a correspondent that the road from Loughborough past Six Hills and on to Melton is in a very bad condition.

With regard to the route from Gloucester to Hereford, we learn that the best way is through Newent and Dymock, turn left at the Trumpet Inn, then on to Hereford. This is a shorter road than the usual main road, and, though narrow, has almost invariably an excellent surface.

On the Bristol-Liverpool Road it is best to follow the section to which we have just referred, continuing through Leominster, Ludlow, Church Stretton, Shrewsbury, Wem, Whitchurch. This road is free from heavy traffic, is more picturesque, and little, if any, longer than the conventional highway.

What he didn't know.

Some Chester ignoramus, signing himself "Pedestrian," in a Liverpool paper, asserts that as petrol will be unobtainable after the end of April it will be possible to see who has been hoarding the spirit. All drivers of "road juggernauts" seen after the end of April, this narrow-minded person asserts, will be the culprits.

Of course, "Pedestrian" had not the sense to see that it is difficult, if not impossible, to discriminate between a war worker and a non-war worker, quite apart from the fact that it would be no crime at all for a man to save his petrol until May or June if he preferred that month for his motoring. However, the bigoted scribe referred to will be sadly disappointed when he learns that the Petrol Committee will, after all, continue to allot a small quantity of petrol to motorists for business and other national purposes.

The editor of the *Liverpool Evening Express* is deserving of an Iron Cross for publishing such piffle.

"Where can he get it?"

A correspondent informs us that he wants a 4 h.p. machine, two-stroke engine, spring frame, chain-cum-belt transmission, three-speed gear. Where can he get it? We confess we are floored.

Shall we get More Petrol?

Many people still persist in the supposition that with the large stocks of petrol known to exist throughout the country, an abundance of petrol will be available ere long and permits resumed. This supposition seems to be based on the expectation that the submarine menace will be successfully grappled with in the near future.

Another Rara Avis.

During a recent test of War Office machines a keen naturalist accompanied the party, and the greatest point of interest of the day was—to him, apparently—a passing glimpse of a pair of great crested grebes on Compton Verney Lake, near Warwick. "They certainly are beautiful flowers," observed the manufacturer, who was evidently a bit of a novice in this respect.

Second-hand Prices.

The scanty extra allowance of petrol that has been meted out by the Petrol Committee to a fortunate few licence-holders appears to have slightly checked the downward tendency of second-hand prices. On comparing the current average prices of well-known makes with those obtaining a month ago, we notice ten examples are down in price in amounts varying from £2 to £10, though in seven instances a slightly upward tendency is shown.

A New Meaning.

Many words have acquired quite a different meaning in the minds of most of us since the outbreak of war. "Exemption" was usually associated with licences and income tax; "Tribunal" with the French Revolution or as the name of a local paper; a "Transfer" is reminiscent of our childhood and the sticky pictures we used to plaster on the backs of our hands. But the verb "to wait" is probably the most fully realised. I wait, thou waitest, he waits! What for? The decision of the tribunal, the income tax, petrol, the grand push, and peace.

Bosch British Interests Bought by Vickers.

We understand that the Bosch British interests, and presumably the premises and plant in Tottenham Court Road, London, have been acquired by Messrs. Vickers, Ltd. It will be remembered that this business was offered for tender by the Board of Trade Department concerned in the winding up of enemy businesses. With regard to the Bosch patents, we believe we are right in saying that they, in common with other enemy patents, are by arrangement between the belligerent Governments held over for some form of equalised treatment after the war. However, these really do not play any important part in the construction of a magneto, and in the main refer to little detail improvements, by no means all of which have been embodied in the magnetos sold to the public.

Home-produced Substitutes.

Recent observations in these pages have drawn attention to the fact that the new ban on petrol substitutes hits those substitutes produced in the British Isles just as hard as it hits those coming from abroad and occupying valuable tonnage. It has been pointed out that the possibilities of developing the shale oil industry in the North are enormous, and shale oil (Scotch paraffin) is among the best of the substitutes. The ban should be on imported oils only, and thus, while fully accomplishing its object, it would further tend to develop a most valuable home industry.

The Popular Feeling.

The pith of the sentiment is: Cut off the foreign supply, but let us have free run of our own oilfields for our indispensable commercial vehicles.

Average Prices.

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the figures for the preceding five weeks. Thus the general trend of the market is visible at a glance, though many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average.

Make.	Year.	H.P.	Average for last week.	Previous weekly average.
A.J.S.	1916	6 combination	—	£96
"	1914	6 combination	—	£56
"	1916	4 combination	—	£90
Allon	1916	2¾ 2-speed	—	£33
"	1915	2¾ 2-speed	£27	£26
Ariel	1915	3½ 3-speed	£45	—
"	1914	5-6 combination	—	£55
Bat	1914	6 3-speed	—	£46
Bradbury	1914	4 2-sp. sidecar	—	£44
Brough	1916	3½ 2-speed	£55	£52
B.S.A.	1916	4½ Mod. K. s-car	—	£65
"	1915	4½ Mod. K. s-car	£60	£57
Calthorpe	1916	2¾ 2-speed	£36	—
"	1915	2¾ 2-speed	—	£29
"		2½ 2-stroke	—	£23
Chater Lea	1913	8 combination	—	£35
Clyno	1915	2½ 2-stroke	—	£28
"	1914	6 combination	—	£65
Douglas	1916	2¾ T.T.	£48	—
"	1915	2¾ 2-speed	£47	£47
"	1914	2¾ 2-speed	£38	£35
Enfield	1916	6 combination	£74	£78
"	1915	6 combination	—	£68
"	1916	3 2-speed	£45	£45
H.-Davidson	1916	7 combination	£84	£80
"	1915	7 combination	£68	£68
Henderson	1916	7 combination	—	£100
Humber	1915	6 combination	—	£65
"	1914	3½ sidecar	£35	£35
Indian	1916	5 combination	—	£66
"	1915	5 combination	£43	£47
"	1916	7-9 combination	£87	£90
"	1915	7-9 combination	£70	£70
James	1916	4½ combination	£67	£74
"	1916	2-sp., 2-stroke	—	£30
Levis	1916	2¾ Popular	£25	£24
"	1915	2¾ Popular	£20	£22
Matchless	1915	7 combination	—	£75
New Hudson	1916	2-sp., 2-stroke	—	£28
"	1915	4 combination	—	£48
Norton	1916	3½ 2-speed	—	£47
"	1915	3½ T.T.	—	£32
P. & M.	1915	3½ combination	—	£65
"	1914	3½ combination	—	£55
Premier	1915	2½ 3-speed	—	£28
"	1914	3½ 3-speed	£47	£46
Rover	1916	3½ T.T.	—	£48
"	1915	3½ T.T.	—	£40
R. Ruby	1916	2¾ 2-stroke	—	£30
Rudge	1916	3½ Multi	£45	—
"	1915	3½ Multi	—	£40
Scott	1916	3⅜ combination	—	£60
Sunbeam	1916	8 combination	—	£110
"	1916	3½ solo	£70	£73
"	1915	3½ combination	£80	£73
Triumph	1916	2-stroke	—	£39
"	1915	4 countershaft	—	£50
Zenith	1915	8 Gradua	—	£62

Motor Cyclists and National Service.

OPENINGS FOR MECHANICS AND DRIVERS.

WHEN the National Service scheme was inaugurated *The Motor Cycle*, together with its allied journals, was placed at the disposal of the Director-General of National Service with the object of obtaining recruits with a special knowledge of motor work. This offer was a continuation of *The Motor Cycle* recruiting scheme of 1914-5-6, which resulted in 12,362 recruits being obtained, and saved the country several thousands of pounds, as the work was purely honorary. Our offer was accepted, and at the request of the authorities we have already examined a great many men who have offered their services for various forms of work where their experience in mechanical matters is likely to be of national use.

In furtherance of the latest scheme, we append a list of vacancies now open to National Service volunteers with mechanical training or experience as motor drivers. This list is published at the request of the Employment Department of the Ministry of Labour, which, by arrangement with Mr. Neville Chamberlain's department, receives from employers of labour particulars of individual vacancies open to National Service volunteers.

Any reader competent to fulfil one of the positions should visit his nearest employment bureau, taking with him this journal and quoting the reference number shown. It should be clearly understood that men already engaged upon Government work may not apply.

The following men are required at once:

M.T. 1.—One Motor Lorry Driver, able to undertake running repairs: 52½ hours per week.—Worcester.

M.T. 2.—Two Men for Motor Tractor Driving and Ploughing; preference given to those with a knowledge of cycles and motors; fairly strong; 56 hours per week of 7 days.—Towcester.

M.T. 3.—Two Motor Fitters, skilled in fitting and erecting internal combustion engines, magneto and carburetter repairs, valve timing, etc.; 56 hours per week.—Macclesfield.

M.T. 4.—Two Motor 'Bus Drivers, experienced in driving public service vehicles or commercial lorries; 60 to 70 hours per week.—Macclesfield.

M.T. 5.—One Motor Lorry Driver, thorough knowledge of driving 2 ton lorry, the London district, docl: regulations, and how to load and unload: 8 a.m. to 6.30 p.m.—London.

M.T. 7.—Three Turners, general or marine, able to use micrometer: 53 hours per week; urgent Government work.—Lowestoft.

M.T. 8.—Two Fitters, marine and general; 53 hours per week; approximately 15 hours overtime per week; urgent Government work.—Lowestoft.

M.T. 9.—Two Motor Chassis Fitters, used to overhauling of large vehicles; 54 hours per week.—Barnsley.

M.T. 10.—One Motor Engine Fitter, experienced; must have served apprenticeship, and be used to motor 'buses; 54 hours per week; good steam engine fitter would do.—Barnsley.

M.T. 12.—Sixty Fitters, skilled men for aeroplane work; war bonus payable in war scrip; very urgent Government work.—Bristol.

M.T. 13.—Two Fitters, used to petrol engine work, tuning up; 60 hours per week; very urgent Government work.—Bristol.

M.T. 14.—One Motor Mechanic; skilled man well up in repairs of private and commercial steam and petrol cars and lorries; 54 hours per week.—Poole.

M.T. 15.—One Garage Foreman, experienced motor mechanic; must be capable of organising the carrying out of repairs of motors and omnibuses for public utility service; able to take charge; varying hours, subject to Sunday work, according to circumstances; very urgent.—Wrexham.

M.T. 16.—Two Motor Mechanics, experienced in 2 to 5 ton motor 'buses; 56 hours per week, subject to Sunday and night work according to circumstances; very urgent.—Wrexham.

M.T. 17.—Ten Motor Engineers, experienced; 53 hours per week.—Burnley.

M.T. 18.—One Motor Fitter; upkeep of plant: 53 hours per week.—Warrington.

M.T. 19.—One Fitter, competent to do necessary repairs and superintend a fleet of motor lorries; must be qualified mechanic; very urgeot Government work.—Glossop.

M.T. 20.—Four Engineers' Fitters for aeroplane work; highly skilled, must work to 2-1000th of inch; 56½ hours per week, with 12 hours' overtime; no Sunday work; urgent Government work.—Eastbourne.

M.T. 21.—Three Turners centre lathe, aeroplane work; 50 hours per week.—Ipswich.

M.T. 22.—One Engine Driver for 5 ton steam tractor; experienced, and able to do own running repairs; 57 hours per week.—Guildford.

M.T. 23.—Two Traction Engine Drivers; 52 hours per week.—Dunkeld.

M.T. 24.—Two Petrol Motor Lorry Drivers, used to heavy work; 60 hours per week; very urgent Government work.—Glossop.

M.T. 26.—Two Motor Omnibus Drivers, experience necessary; uniform provided; 60 hours per week; Leyland and Thornycroft 'buses.—Barnsley.

M.T. 27.—Two Petrol Motor Lorry Drivers.—Warrington.

M.T. 28.—One Motor Lorry Driver; able to do heavy lifting, and drive Ford car; 53 hours per week; occasional overtime.—Wallsend.

M.T. 29.—Six Engine Fitters, aircraft work; 54 hours per week.—Hendon.

M.T. 30.—Ten Fitters for aeroplane engine work: 51 hours per week; Government work.—Rugby.

M.T. 31.—Five Inspectors for aeroplane engine work Government work.—Rugby.

M.T. 32.—Twelve Viewers for motor work; 53 hours per week, with overtime; Government work.—Coventry.

M.T. 33.—One Assistant to Chief Inspector; knowledge of testing material, and some technical school training: 44 hours per week: Government work.—Peterborough.

M.T. 34.—One Driver and Mechanic for steam lorry (motor); experienced in driving Garrett 3 ton steam lorry or other similar vehicle; general knowledge of repairs; 56½ hours per week in summer, 51 in winter; extra allowed for time worked on Sundays; very urgent.—North Camp.

M.T. 35.—Two Heavy Motor Drivers (steam); capable of driving 3 ton motor lorries; strong, and able to carry sacks of coke; 58 hours per week.—Bournemouth.

M.T. 36.—Three Steam Lorry Drivers; 53 hours per week: list of lodgings kept at local Employment Exchange.—Elswick.

M.T. 37.—One Steam Lorry Driver; 7 ton waggon: able to do own repairs; chiefly to travel Birmingham district.—Willenhall.

M.T. 38.—One Motor Lorry Driver; cotton industry; experienced; able to do own running repairs; Maudslay 4 ton lorry; one journey to Manchester and back (with load) is a day's work.—Westgate.

M.T. 39.—One Petrol Lorry Driver; 50 cwt. lorry; Government work. Walsall.

M.T. 40.—One Fitter; general work; able to use micrometer; 54 hour week and overtime.—Bexley Heath.

M.T. 41.—Seventeen Fitters; motor work; 54 hour week.—London.

M.T. 42.—Six Motor Car Repairers for garage; experienced in motor lorries and ambulance repairs; 53 hour week, and overtime; special men will be paid special wages, according to qualifications; Government work.—Newcastle-on-Tyne.

M.T. 43.—Forty Fitters for aeroplane work; 54 hour week; Government work.—Lincoln.

M.T. 44.—Twenty Erectors; aeroplane work; 54 hour week; Government work.—Lincoln.

M.T. 45.—Four Fitters; used to aeroplane work; 7 a.m.—8 p.m.; meals supplied at canteen, and transit by motor 'bus to and from works at small weekly cost.—Bognor.

M.T. 46.—Fifteen Metal Turners; aircraft construction: 54 hour week, plus overtime; Government work.—Yeovil.

M.T. 47.—Eight Viewers for aeroplane engine works; 52½ hour week, plus overtime.—Dumfries.

M.T. 48.—Three Turners, used to fitting machinery or engine work, and general turning; general engineering; 53 hour week, and overtime.—Stockton-on-Tees.

M.T. 49.—One Engine Fitter, experienced in repair work on turbines; 56 hour week and overtime.—Stratford.

M.T. 50.—One Assistant Works-Manager for aircraft works; engineering experience necessary; if possible with knowledge of premium bonus system; normal hours 56 per week; high wages; urgent Government work.—Eastbourne.

M.T. 51.—Three Turners, motor work; 54 hour week.—London.

M.T. 52.—Six Turners for motor cylinders and 8in. beds: day and night shifts; 52½ or 55 hours per week.—Heathall.

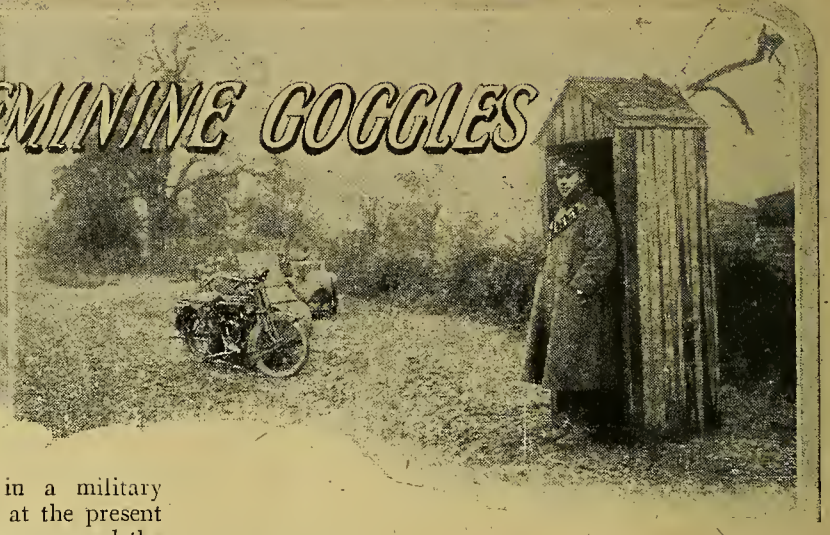
A BEWILDERING ASSORTMENT.

THERE are many systems of lubrication, and at present misunderstanding often arises through the lack of understood terms. The systems are (1) mechanical oil pump, (2) visible drip by spring hand pump, (3) visible drip by crank case suction, and (4) mechanical feed by crank case suction two-stroke.

All are mechanical and all automatic, therefore these two words do not suffice to distinguish one from the other. Two are drip feeds, and 1, 3, and 4 are worked by the engine—quite independently of the rider. For the sake of clearness and brevity, the systems might be tabulated as follow: (1.) Pump feed. (2.) Hand pump drip. (3.) Suction drip. (4.) Slot-suction feed.

THROUGH FEMININE GOGGLES

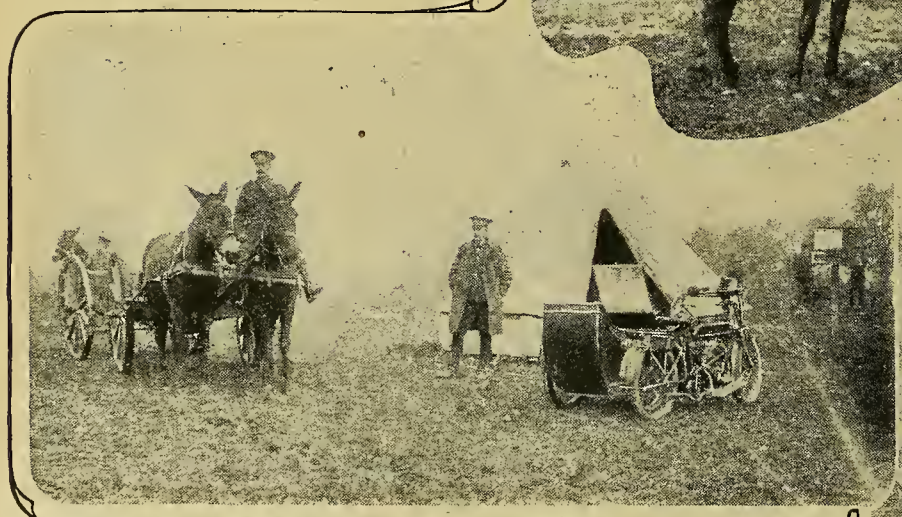
A VISIT TO A MILITARY CAMP.



PERMISSION to use a camera in a military encampment is not easy to obtain at the present time, but the kindness of a captain procured the necessary forms from a provost marshal, and one raw March morning I hauled my sidecar outfit from its garage to sally forth in search of a military camp. The early spring is not the best time to visit troops that are placed under canvas, and it was an ocean of mud that heralded the proximity of the headquarters of an artillery company and A.S.C.

The main approach was through a farmyard, up a hill, into a grass field, or what in peaceful times had been a grass field: now it was a very sturdy blade that dared to show itself through the quagmire that once had been a meadow with buttercups and daisies as its starriest occupants. The slush and mud of the entrance for a moment daunted me; what if, by a false move of the levers, I fouled the mixture and brought the machine to a standstill! However, nothing venture nothing win, so, putting the engine in low gear, I steered carefully through the gateway opened for me by one of the bystanders.

Now I fully understood why the military motor cyclists had left their mounts outside in the roadway. Few solo riders could maintain their balance through the slime, nearly a foot deep, that faced us for a hundred yards or so. With one hand on the hand-controlled clutch to release the strain should the engine object, I negotiated the most slithering mass that one could picture. Sometimes for a moment the rear wheel would refuse to grip, or the tyre, worn smooth with



Many men out in trenches look back upon the time of training in Blighty as "good old days." To some the mules will recall adventures, pleasant and otherwise. On the right is the "strong man" of the camp holding a sack of 80 lb. weight with his teeth.

Through Feminine Goggles.—

much travel, would skid sideways. When we reached higher ground a firmer surface presented itself.

I confess I heaved a sigh of relief. Anxious thoughts had arisen as to whether I might have to step down into mire which would reach above my driving boots. Very slowly I proceeded until a soldier on guard barred the way, but, our permit inspected, we were allowed to produce the camera. A burly sergeant-major escorted us around the camp, where men in various stages of undress uniform were on fatigue duty. Harness cleaning, cooking, and horse clipping were a few of the duties that were in operation. The men were quite willing to face the camera on condition that they should receive a photograph. Each seemed especially fond of his own particular steed and anxious to have "its likeness."

The Amateur Chefs.

The domestic arrangements were most interesting to the feminine observer, and when one remembers one's brother's attempts to provide an *al fresco* meal, one wonders how much practice is necessary to turn these men into cooks when their apparatus is so primitive. Doubtless they manage better than a woman would do, as they appear to have no objection to volumes of smoke. A few picture records made, and we took our departure, and glad were we to leave the muddy and slippery ground for the high road again.

MAY WALKER.

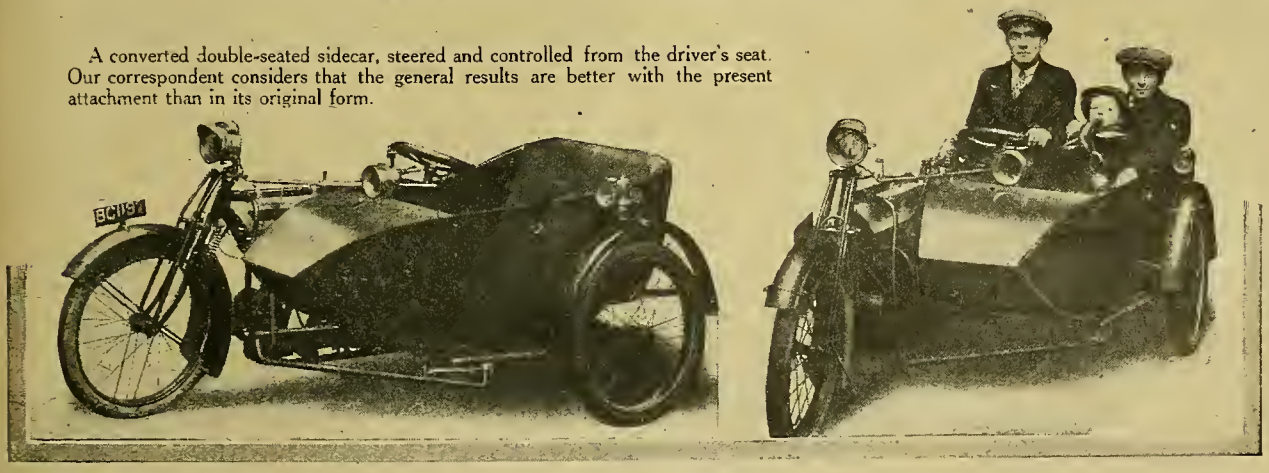
A Converted Double-seated Sidecar.

How a Reader obtained Protection for the Driver.

IN our issue for March 29th we dealt with the subject of motor cycles for the disabled, and although the accompanying photographs were not submitted with the idea of showing a disabled man's machine, it is very similar to some we then described for such a purpose. Mr. E. Hulse's device may also interest riders who desire cleanliness and at the same time wish for a sociable outfit. He says:

"I have made the sidecar up myself, which, as you can see, has wheel steering and pedal controls to clutch and brake. I can say that my old 1912 A.J.S., which is attached, has never yet given me a moment's trouble on the road. The body of the sidecar is built of three-ply wood, and, strangely enough, the engine seems livelier with the sidecar than it was before. Both chassis and body, also the sidecar wheel, are sprung, the body being on three coil springs under seat. I would be pleased to show the conversion to anyone interested who calls at my address, 34, Regent Street, Kingswood, Bristol."

A converted double-seated sidecar, steered and controlled from the driver's seat. Our correspondent considers that the general results are better with the present attachment than in its original form.



Sparking Plug Condensation.

READERS will agree, writes "Ixion," that Mr. Kerslake-Smith and "C.W.B." (whose letters appeared in *The Motor Cycle* of April 5th, p. 311) have handled the above topic very interestingly, though the former offers no suggestion why the trouble should be so much commoner on water-cooled engines, and is certainly in error in thinking that a few turns of the engine should disseminate the globule of water from the sparking plug points; my own experiences imply that if the condensation once drowns the plugs it is necessary to take them out and wipe them.

Two rival theories were sent to me privately. An East Cowes correspondent makes the rather dubious suggestion that the moisture is due to internal sweating of the water jacket on motor car engines, and he states that it is often possible to trace the water line of a metal hull from the inside of the ship by the sweat on the metal. The other theory is advanced by a sparking plug maker, who compares the condensation to the misting of eyeglasses when a person enters a greenhouse. As a water-cooled engine cools down more slowly than an air-cooled pattern, the dew point is maintained in it for a longer period, and condensation is therefore more marked.

MILITARY NOTES.

D.R.'s of the Tanks. Another Airman-Motor Cyclist killed.

12,362 RECRUITS.

SINCE the war *The Motor Cycle* has dealt with 12,362 applications from motor cyclists in connection with recruiting for the different motor sections of the Army.

AN OPPORTUNITY FOR FEMALE LABOUR.

AN experienced motor cyclist reader of this journal, who has had a public school education—five years French and three years German at school, and passed B1—is at a training camp in England working as a waiter in an officers' mess. He appeals to us, "Is this as it should be?" We offer no comment, but leave the case—which is not isolated—to the judgment of readers.

D.R.'s OF THE TANKS.

AMONG our regular flow of letters from appreciative readers of *The Motor Cycle* now stationed in the different war zones is the following from L.-Cpl. D. Austin-Jones, writing on behalf of a group of despatch riders of the "Tanks":

"We venture to send you the enclosed photograph as a token of appreciation of *The Motor Cycle*. We would forfeit our rum rations rather than this regular treat. The fact that these papers are usually a week or a fortnight old does not in any way alter their value to us, and if their donors were but to miss sending one copy, the result for those persons would be a severe '*strafe*'—six-fold.

"The photograph will be of interest, being the first and only one in which figure the despatch riders of the headquarters of *the* branch of the Army of which England expects so much. Needless to say, we are all Triumph-ant riders, and, except for minor troubles (often avoidable), we will make a stand, on behalf of the reliability of our sturdy mounts, in any circles.

"The machines which appear in this photograph are our second mounts, our first cycles, after five months' hard work on bad and indifferent roads, not to mention precarious tracks and species of ploughed field (the ploughing is the handiwork of Monsieur Fritz), having been rendered unserviceable, inasmuch as each machine urgently needed a workshop overhaul. Our new mounts are the 1916 W.D. models, and hitherto have given every satisfaction, but to echo the plaint of another D.R.—good reliable lamps and generators are wanted.

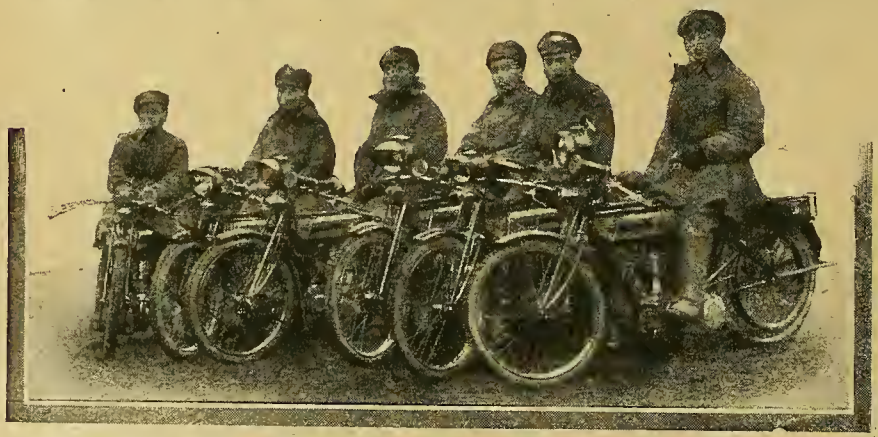
"We all unite in wishing your paper every success during its future career."

MORASS IN MESOPOTAMIA.

CAPT. S. W. CARTY, A.S.C., M.T., well known in the Liverpool and Newcastle districts, particularly in club circles, has been in Mesopotamia for some time past. The Mesopotamian trip is Capt. Carty's second period of active service abroad. At the time of writing he mentioned that the rain had converted the country into a vast morass, and that the lorries were held up for the present.

IRISHMEN IN THE SERVICES.

THE proceedings at the annual general meeting of the Ulster Centre of the Motor Cycle Union were more or less of a formal nature, as all competitions and activities on the part of the Union were in suspense during the past year. The report of the committee mentioned that over eighty members of the centre, including fourteen members or ex-members of its committee, had joined the Forces, and representatives of the centre were serving in every theatre of war. Twenty-seven of the members held commissions, four had won the Military Cross, and a number of others received various distinctions. Two of the members, who were amongst the first batch of despatch riders who went out with the British Forces, had the honour of being attached in that capacity to General French's personal staff, and were now serving with the R.F.C.



Despatch riders attached to the headquarters staff of the H.B., M.G.C. Reading from right to left their names are: R. Wheeler, G. W. Watson, B. Aird, E. Higgins, B. Blackford, and D. T. Austin-Jones All ride Triumphs.

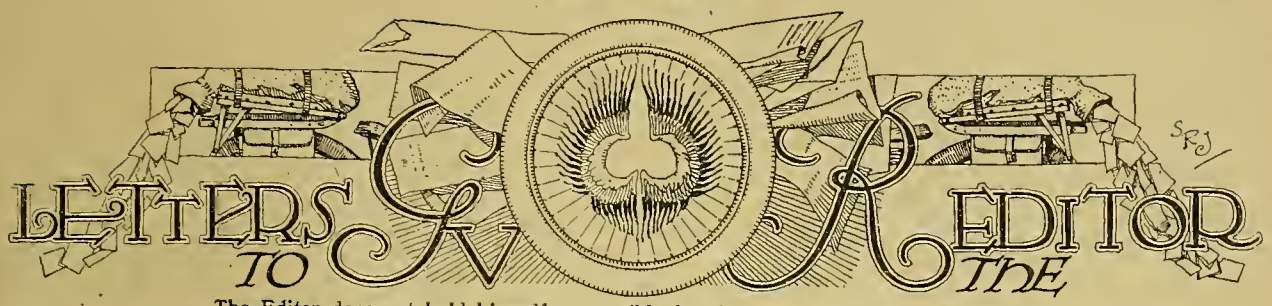
The late Lieut. G. T. Gray, R.F.C., as a motor cyclist. He is seen mounted on a Rudge-multi, astride which he scored many successes.

THE LATE LT. G. T. GRAY.

IT is with sincere regret that we have to record the death of Sec.-Lt. G. T. Gray, an observer in the Royal Flying Corps. As a Rudge rider who has performed conspicuously in the important competitions of pre-war days, G. T. Gray will be known to thousands of our readers, to many of whom he was a good friend. We have no particulars at present of how Gray met his fate. At the outbreak of war he joined the 7th Middlesex Regiment, and served for a time at Gibraltar. Later he was granted a commission in the Royal Engineers, and was for some considerable time stationed at a Signal Service Training Centre, training despatch riders. He was married in the spring, and our sympathy goes out to his widow. A few months ago he was transferred to the Royal Flying Corps, and had been acting as observer in France for some weeks. Only a few days ago a member of our staff received a long letter from G. T. Gray giving a most interesting and thrilling account of his first encounter with a Hun machine in the air at six thousand feet.

CHASING THE HUNS.

AN officer attached to a Howitzer Battery, in writing us from France, comparing the respective progress made during the last six years by British and American motor cycle manufacturers, and, incidentally, summing up that American manufacturers have made much greater strides in design than home manufacturers, says: "After five months of mud and slush of the Somme we are out of it at last, chasing the Hun like fury, so please excuse pencil. Best regards for the old blue cover."



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

THE FITTING OF GAUZES.

Sir,—I should like to warn riders of two-strokes to be careful where they fit the gauzes in the induction pipes of their machines when running on substitutes. If fitted between the engine and oil supply the gauze gets gummed up with oil, and causes difficult starting, also it prevents a proper supply of oil from reaching the engine. I have seen trouble caused by this gauze when wrongly fitted.

King's Heath. EXCELSIOR.

AIR V. WATER-COOLING.

Sir,—With reference to "Engineer's" letter *re* water-cooling of motor cycle engines. Can "Engineer" state what actual advantages the air-cooled engine has over a well-designed water-cooled motor such as the Scott, which, by the way, has no exhaust valves to get incandescent? Has "Engineer" ever ridden a Scott machine? If he has not done so, he will find that it is possible to run all out for as long as he desires, without the little rest advocated for air-cooled engines.

I for one certainly do not agree with the view expressed, viz., that the water-cooled engine will cease to exist on motor cycles and motor cars; neither do I hold that a modern air-cooled engine will tear all out around Brooklands longer than a water-cooled engine such as the Scott. The usual disclaimer. C. B. THWAITE.

SINGLE V. TWIN.

Sir,—I have been unusually interested in the recent discussion *re* the efficiency of the A.B.C. engine, as I have owned one of these machines for a considerable time.

There are a few statements that I would like to make in reply to Mr. Osborne de Lissa's letter in your issue of January 25th, though it will be rather late in the day before this letter is published, I am afraid. He says: "It is impossible to tell whether an engine has exceptionally long life until there are many on the road in the hands of the general public pulling sidecars." Can Mr. Osborne de Lissa explain why an engine should be compelled to pull a sidecar to justify its claim for long life? After all, the A.B.C. is meant primarily as a solo machine, and, from considerable personal experience, I can testify to the small amount of wear in the A.B.C. engine, after thousands of miles running.

With regard to the perfect smoothness of the M.A.G. engine, surely it is almost an axiom that, *cæteris paribus*, a V twin cannot run as smoothly and evenly as a flat twin.

As for overheating of plugs on the A.B.C., I have found this non-existent, provided the right type of plug is used.

I thoroughly support Mr. Granville Bradshaw in his statements, and I am looking forward to the time when a section of the motor cycling public will have some "rude shocks" from which they have hitherto been debarred on account of the war. R. C. CAMPBELL.

Dinapore, India.

Sir,—I write as a solo rider, requiring a speedy and reliable go anywhere machine, free from the necessity of frequent adjustments, and requiring the minimum of time and trouble to keep in good running tune.

I contend that the single-cylinder engine with side by side valves, properly designed and constructed, is *the* engine for such a mount. Surely simplicity and a minimum of attention required are the keynotes of such a machine, and no twin, either "flat" or "V" type, will ever equal the single on these points. Even if the single were slightly inferior to the twin in power and flexibility it would still have preference for these two points only, but I believe it to be superior rather than inferior.

Let me confine my remarks to the 500 c.c. size of engine.

Engine balance. There are at least two single-cylinder engines on the market in which the engine vibration at any ordinary road speed is not either objectionable or even noticeable, and I entirely discredit any statement to the contrary.

"Ixion" says that three-year-old flat twins with roller bearings show less wear than is allowed as clearance for new phosphor bronze bearings on more conventional engines. Why compare the wear on a flat twin with roller bearings with that on a single with plain bearings? One of the singles I mentioned in connection with engine balance is fitted with roller bearings to the main shaft and big end, and they show just as great durability in road use as those of the flat twin do.

"Ixion" further states that the flat twin offers better balance and better torque, in conjunction with reduced weight and an increase of efficiency for a given c.c., than do other types of engine.

I have already said that the better balance is in practice for motor cycle work negligible.

The less even torque of the single is a feature which can be nullified by a properly designed transmission system, and this has been accomplished by at least one manufacturer.

If the flat twin engine is lighter in weight than the single of the same c.c., I suggest that this is gained entirely at the expense of weight in the flywheel, making the engine inflexible at low rates of r.p.m., and robbing it of ability to pull a reasonably high gear up hill.

I do not know what "Ixion" means by "increase of efficiency for a given c.c.," but if greater b.h.p. is meant, the boot is on the other leg. The world's 500 c.c. speed record is still held by the despised "single of conventional design" with side by side valves, and I believe over 12 b.h.p. can easily be obtained from one of these engines on a bench test.

The comparison of the long inlet pipe of the flat twin, with the manifold of a six-cylinder car engine, is hardly a fair one. The six-cylinder engine manifold is jacketed by the hot air inside the bonnet of the car when running, whereas the inlet pipe of the flat twin being at the side of the engine, both it and the carburetter are exposed to a continual blast of cold air. In the single the carburetter is tucked snugly away behind the engine, and the inlet pipe is extremely short. The air supply does not need heating, and the engine will, consequently, start up from dead cold without a single misfire, and violent acceleration can be obtained straight away if required, but both the six-cylinder car engine and the flat twin will spit and splutter for a few minutes if any attempt at acceleration is made under load after starting up from dead cold. A. C. HUSKINSON.

THE NEED FOR PAPER ECONOMY.

The only way to ensure regular receipt of this journal is to place a definite order with your newsagent, or the publishers.

This action will enable newsagents to limit their orders to the actual number of copies required, and so effect a saving of paper, labour, and railway transport.

RETURNS ARE SOON TO BE STOPPED.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—Regarding the correspondence in your issue of March 29th I would like to make a few remarks.

I had my left eye removed six years ago, and have never suffered any inconvenience in the matter of judging distances in the street. For the last four years I have both cycled and used a motor cycle and tricar a great deal, and consider myself as good a judge of distance as a person with two eyes.

Regarding Mr. Gray's remarks, I agree so far as very short distances are concerned. I am a chemist and have to be careful when pouring from a bottle into a test tube, but find no difficulty in pouring liquids into larger vessels.

One inconvenience one suffers through the loss of one eye is that one has a "blind side," so to speak. Fortunately, the rule of the road is keep to the left, so that when out for a spin I have no trouble except that if riding with a friend I request him to keep on my right side. How a person who has lost his right eye feels on a cycle or motor cycle regarding others overtaking him I do not know.

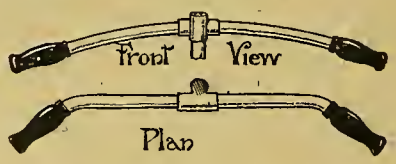
Further, a one-eyed man can play billiards just as easily as if he had two eyes. Actual experience, to my mind, counts better than all theories. No doubt a mirror on the handle-bars would assist those with only one eye.

Liverpool. CHEMIST.

TWO-STROKE V. FOUR-STROKE.

Sir,—I am glad to see that someone has forestalled me in contradicting "Ixion's" remarks on baby four-strokes and two-strokes.

Like "Four-stroke," my present machine has the 293 c.c. J.A.P. engine. This engine has a wonderful ability to "rev.," and its power is astonishing. My top gear is about 5¼ to 1, and I have done 53 m.p.h. over a measured quarter-mile. Of course, at this speed the revs. are almost alarming, and I should not like to try to keep it up over any distance, but the engine seems to enjoy doing 30 m.p.h. or so for long distances and never gets tired *if a suitable plug is fitted*. I have tried numerous plugs, and the Forward and Sphinx seem the most satisfactory. The only two-stroke I really enjoyed riding was a 1915 Connaught, slightly altered, with a Senspray carburetter. This machine would average 25 m.p.h. comfortably after some slight improvements had been made to the cooling and exhaust pipe.



Elevation and plan of handle-bars described by H. St. V. Addenbrooke.

Out of twelve makes of two-strokes this Connaught and a Villiers-engined "Diamond," also rather altered, are the only machines which can, in my opinion, possibly be compared with the baby four-stroke. Two-strokes need an exceptionally easy passage for the exhaust gases, and with this end in view the rear silencer of the Villiers-engined machine was removed, as it had a rather narrow passage connecting it with the front silencer, and a long extension pipe 1¼in. diameter was fitted instead. This undoubtedly made the engine keep much cooler.

In conclusion, I should like to say a word about handle-bars. I have had a great many different types, and have bent them into various shapes, but the most comfortable shape I have found yet is a wide bar, almost straight, slightly dropped, with the grips ("Rough Rider" long rubber pattern) slightly bent back and down as in the sketch.

H. St. V. ADDENBROOKE.

Sir,—If "Four-stroke" could not get more than 60 to 80 m.p.g. out of a 2½ h.p. two-stroke, then there must have been something wrong with it.

From Hounslow to Marlborough is 64¾ miles. I have been over this road myself, and I should think that any two-stroke could average 20 miles per hour over the road.

I have ridden from London to Leeds, 190 miles, on a 2¼ h.p. single-geared Radco two-stroke in nine hours (this including stops for petrol), so that the average speed for the whole journey was over 21 miles per hour; and for several miles touched 40 miles per hour, *timed* on the measured miles on the Great North Road. As regards petrol consumption, I was *always* able to get 120 miles per gallon out of my Radco. The return journey from Leeds to London was covered in the same time, over the same road, and I never experienced any "drying up."

I think that the lightweight two-stroke will beat the lightweight four-stroke of the same c.c. every time, and without the slightest doubt on hill-climbing, as it is an acknowledged fact that a two-stroke develops more power than a four-stroke when climbing. I have never had to get off for any hill.

The c.c. of the Radco is 211, 62×70 mm.

Can "Four-stroke" show any private record of a single-geared four-stroke of the same c.c. to equal this?

Usual disclaimer, please. A.R.T.

Walthamstow.

FORCED INDUCTION FOR FLAT TWINS.

Sir,—I think "C.L.V.R. 2872's" statement on the subject of forced induction for flat twins is a very interesting one and worth looking into, but I feel a bit doubtful as to his remark on two-stroke crank case compression, which is far from being perfect, considered from the engineering standpoint.

From time to time I have been a keen student on the subject with a view to obtaining a high mean effective pressure. This can be attained by raising the induction pressure, the suction temperature being kept as low as possible, and at the same time enlarging the combustion chamber. Now to attain this effect is quite simple, and may be carried out as follows: Take a four-stroke engine and fix a crank case compression device similar to that of a two-stroke. The cycle of operation is thus: On suction stroke a comparatively rich mixture is induced *via* the inlet valve as usual, and at the bottom of the stroke compressed air in the crank case rushes up into the cylinder, diluting the mixture to a correct strength, with the result that the induction pressure, *i.e.*, the pressure before compression, is thereby raised to, say, 2 lb. per square inch. The rest of the operation is exactly the same as the ordinary constant volume cycle, save that at the end of the explosion stroke the transfer ports are uncovered, and therefore the compressed air again rushes up the cylinder, assisting effective scavenging. This slight modification to the usual Otto cycle is no means new to the students of engineering.

T. SHODA, B.Sc. (Glasgow)

Sir,—Mr. Edwards, in his letter in the issue of March 8th, says, "Long induction pipes can easily be lagged or bound with asbestos," and implies that by so doing there is no need for anything further to be said or done—in fact, that this solves the whole difficulty. Having tried this expedient on various engines over a considerable period, I have found (I believe in common with most people) that there is very little, if any, improvement to be gained by lagging the induction pipes, though if the whole of the inspired air is warmed before entering the carburetter lagging appears to be beneficial. I therefore maintain that something which will do away with long induction pipes should have a fair hearing, especially if it might mean considerable gain in power in relation to c.c.

Mr. Edwards, in the third answer, asks about the "cycle of the pistons," but, as the "heading" reads flat twins, we will suppose that the cranks are at 180°, as is usual in these engines. That being the case, surely gas, to the amount of the volume of each cylinder (swept out by the piston), will be forced into the crank case when the pistons have reached the inner end of their stroke. If this is the case, and a way was open to *one* cylinder-head, that gas would expand till the pressures in the cylinder-head and crank case were equal, though, of course, each cylinder in turn would not get quite a double charge, as the crank case pressure could not return to that of the atmosphere. However, the charge would be larger than could be obtained by ordinary induction.

Mr. Edwards's objection to the higher compression ratio so obtained is easily altered by designing a cylinder with a larger combustion space. I did not take it that "C.L.V.R. 2872" intended his idea to be tried on a standard flat twin, as Mr. Edwards rather seems to think, in which case some of his arguments would carry more weight. Perhaps automatic valves in the piston are not practical for small engines (or any required to start easily). However, "C.L.V.R. 2872's" idea could perhaps be embodied in a design not necessarily dependent on valves in the

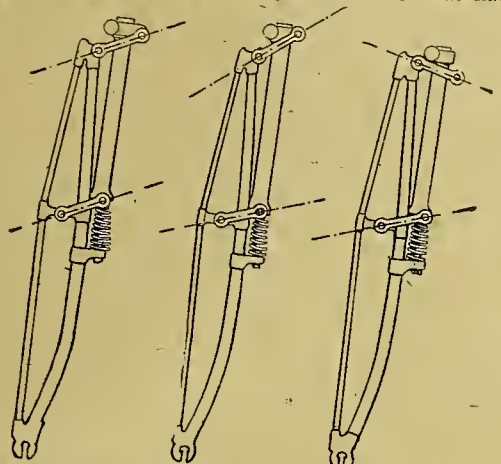
piston—some "port" system, for instance. 3½ h.p. from an engine of 2¾ h.p. seems about right if an efficient transfer could be arranged. S.S.D.

West Bridgford, Notts.

THE MOUNTING OF SPRING FORKS.

Sir,—Being an old reader of your journal *The Motor Cycle*, and a keen motor cyclist, I beg to make a few remarks upon the spring forks of motor cycles, or rather upon the defective manner in which they are often mounted upon a machine.

I own two machines, a Peugeot and another of English make with a Villiers engine and Albion transmission. Upon the latter the fork has been correctly fitted. Upon the Peugeot I have had a Saxon fork fitted which has had to



be remade twice for reasons I will explain later. Generally, when one buys a machine one neglects this part too much—on the contrary, it should receive attention.

A fork, in order that it may work well, should have the shackles parallel, that is to say according to fig. 1; but it often happens that the fork shackles are placed in the manner shown by figs. 2 and 3, which much hinders their working and often stops it altogether as in a fork arranged like No. 2.

I think it may be interesting to the readers of your interesting journal to point out to them these little defects of mounting, which are not due to the manufacture of the fork but to those who have taken the dimensions for the order. I do not think it necessary to enlarge upon the subject—it is easy to imagine the vibration caused in the steering in the case of No. 2. J. CLINTON SMITH.

Paris.

"SOME" BICYCLE.

Sir,—"Ixion," in *The Motor Cycle* of 15th February, casts some doubt on the climbing abilities of two-stroke machines. I should like to relate my experience of a 2½ h.p. Villiers engined Revere, fixed gear 5½ to 1. I have been very surprised at what this little thing will do, and many acquaintances of mine, including several trade and experienced riders, have been astonished when trying the machine. I ride 12 stone, or just a pound or two over. I have never failed on a main road hill, and have been up the following: (1) Elm Grove, Brighton, two to three times daily for months on end. (2) Hill from Preston to Dyke Road, Brighton, missing the 1 in 3 portion. (3) Beachy Head from all directions (three in all), several times each. (4) A hill near Brightling, Sussex, which, I think, must be a single-figure gradient, and, I am told, the second worst in Sussex. The machine will touch 40 m.p.h. by speedometer on a good level road, and will keep going at 30 m.p.h. for long stretches. I have done 52 miles in 2 hrs. 10 mins., and could have cut off the 10 mins. or more if the surface had been good enough. The engine will start always (any weather) if the float is agitated several times, and will two-stroke at 5-6 m.p.h.

I have had the following additions made: (1) Five aluminium cooling fins, split fore and aft, and held by staples passed through holes bored in the fins near the splits, with distance pieces, a cross piece at the top, and nuts to hold secure, also fixed by aluminium wedges. (2) Copper pipe to air intake of Senspray carburetter; this collects air from the back of cylinder *via* a big funnel mouth. (3) Copper plate about 1½×5in., with a hole bored for plug; this stands up vertically, and so catches the draught. Copper disc, 5/- size, on the central terminal above the porcelain, to cool the electrode.

I have used a single-point Sphinx plug now for seven months, and it has never overheated or caused any trouble. I have a drip oil feed to inlet pipe, and give twenty drops per minute for slow and ordinary running, and double for hills and fast runs; Price's Huile de Luxe (summer). The top ring does not carbon up after 800 miles, although a fair amount of carbon gets in the groove. The acceleration is very good. I have given my machine no special tuning, but just keep magneto and carburetter clean and well adjusted. All joints are seen to, and, of course, plug points clean.

The agent from whom I purchased told me that a two-speed was not necessary, and I am inclined to think he was not far wrong. And for a rider scaling about 10½ stone I really think the machine would go anywhere, bar freak hills. E. W. M. PAINE, Capt., R.A.M.C.

TAKING IT AS A SPORTSMAN.

Sir,—Please allow me to give the Petrol Control Committee a good word, because I have not seen one instance where it has had one said for it. This is my experience: On the 12th of October, 1916, I wrote for a licence to purchase petrol at the rate of two gallons per month. On October 17th I got a reply to say that I could have a licence if I sent 3s., which I did on October 18th, and I received my licence on October 25th without any hitch. I have had another licence since then with the same prompt attention. On March 27th I received a circular from the committee regretting that owing to national requirements it could not issue any more petrol licences. I had not asked for a licence, but by sending that circular the committee saved me the trouble. ROBT. W. COCKBURN.

ADJUSTING MECHANICAL PUMPS.

Sir,—We read with interest your reminder in *The Motor Cycle* of the 22nd ult. with regard to the adjustment of mechanical oil pumps now that the weather is due to become somewhat warmer. Your reminder was, of course, perfectly correct, and we really cannot understand Messrs. Best and Lloyd, Ltd., disagreeing with your assertion. To anyone who has had any lengthy experimental work with mechanical oil pumps it is perfectly obvious that adjustment is necessary to cope with the varying viscosity of oil. As a matter of fact, that was one point which the writer always had before him when designing the "Lamplugh mechanical lubricator," and special care was taken to enable the user to make this adjustment in a very simple manner.

One of our oil pumps has now been under test on a motor cycle for some months, and we find that being able to make this adjustment in a very quick and simple manner is a very distinct advantage. S. A. LAMPLUGH, LTD.,

J. STANLEY SPITTLE, Director.

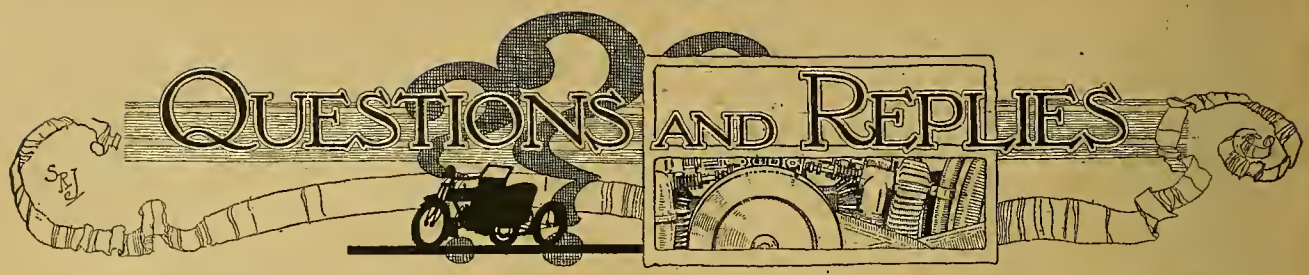
Sir,—We observe your further reference on page 281 of your issue of the 29th ult. to the need for adjustment of mechanical pumps, and would like to say that when our lubricator was first introduced to the trade we regarded the variable setting as a necessity to deal with differing oil viscosity, and made a strong point of this as an advantage, and this was mentioned in your description of the pump.

Experience has, however, since proved to us that the triple grooved sleeve is only needed to deal with engines of various sizes, and we are quite convinced that adjustment to deal with conditions of temperature or viscosity is needless, and this we will be only too happy to demonstrate to you at any time.

What happens is, when the oil is thin, it slips past the ball valve at a sort of minimum opening, while if it is thick and heavy the valve is compelled to a larger opening. It is, of course, possible for the action of a pump to be affected if the oil was in a state more or less of solidity, but we do not consider such a condition likely to arise under normal conditions, and with the grades of oil in general use for the lubrication of the internal combustion engine.

BEST AND LLOYD, LTD.

JOHN H. COCHRANE.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Steel for Magnets.

I wish to get as good a steel as possible for the purpose of making magnets. Could you tell me where to obtain such?—A.M.

With regard to magnet steel, any steel manufacturers in Sheffield could supply to a specification, but *there is no standard.* In any case, it would be necessary for you to obtain a permit from the Ministry of Munitions before you can obtain any material.

Firing on One Cylinder.

My 2¾ h.p. W.D. model Douglas fires on but one cylinder *when starting.* The machine has just been thoroughly overhauled, including cleaning of cylinders and new plugs, and everything possible has been done to remedy the defect. *Both* cylinders fire after from a quarter of a mile to two miles have been traversed.—B.E.R.P.

Possibly, after reassembling the engine, you have omitted to screw up one of the inlet unions tightly, and there is an air leak. This would cause the trouble of which you complain. Or it may simply be due to the cold weather causing the petrol to condense in the inlet pipe.

Changing Down.

I have a 1915 two-speed 2¾ h.p. four-stroke lightweight. (1.) With a two-speed gear, chain drive, what is the best way to change down on a hill without losing way or racing the engine unduly? (2.) I have discovered one or two dents in the driving wheel rim. Is it worth while having them trued up, and would the trouble be worth the cost? (3.) How can I find a good average for the drip feed lubricator, for even when I turn it full on there is no smoke from the exhaust?—C.E.H.

(1.) You are bound to lose a good deal of way with this gear, as it only gives two speeds. All you can do is to change down with the throttle a quarter open, allowing just sufficient time with the gear in neutral for the engine to gain the speed determined by the lower ratio. (2.) If the dents are such as to cause the tyre to be likely to leave the rim, then they should be taken out; but a few dents need not cause you any anxiety. (3.) Run it at about thirty drops to the minute at twenty miles an hour, and give more oil as the engine speed increases; in fact, if you are driving really fast for any length of time, let the oil run through in a fine stream.

A Sooty Plug.

I have a 4½ h.p. motor cycle and sidecar. Will you tell me why the points of the sparking plug should become sooty after a mile or two?—C.J.

The plug becomes sooty probably because the engine is getting too much lubricating oil; or the lubricating oil is working past the piston, owing to worn rings; or, lastly, because you are driving on too strong a mixture, possibly owing to too large a jet. In the last case the soot will be powdery and easily wiped away.

Annealing a Copper Pipe.

I am going to run on a mixture of petrol and substitute. (1.) Would this be properly vaporised and give satisfactory running if taken from the tank through a pipe, wound round the exhaust pipe several times, and then taken to the carburetter? (2.) What is the best way of bending a pipe into this shape? (3.) Would the pipe buckle up if done cold and without special preparations?—F.D.M.

(1.) Two coils round the exhaust pipe should be sufficient in conjunction with a hot air intake. (2.) Most petrol pipes will bend in this way. If, however, they require to be annealed, the pipe should be heated red hot and then plunged into cold water. This will make it soft and allow it to be bent. (3.) The pipe should not buckle if filled with sand and bent carefully.

Timing the Magneto.

I have a fixed ignition magneto on my motor cycle, and though I can get a good speed from the engine it is difficult to get started, and it backfires when I am trying to start. I have tried putting the magneto back a tooth, and it then starts more easily, but loses both speed and power. Could you give me any advice in the matter? Would it improve matters if the magneto were converted to variable ignition, and can this be done? I have verified the timing of valves, and everything seems all right.—C.E.

Your trouble appears to be due to the fact that retarding the magneto one tooth is too much. The retardation, therefore, should be carried out by the sprocket, which should be turned slightly in the same direction as that in which the magneto rotates. The magneto can be converted to variable ignition; in fact, we have published several methods in which this has been done by our readers.

Detachable Valve Seatings.

On the flat-twin Humber I believe the valve pockets are detachable and held in position by a yoke. Could you give me a rough idea of how this is done, more particularly of how the compression is kept?—FEED BLOCK.

There is a bolt situated between the pockets over which a yoke with forked ends fits. The forks at the ends of the yoke press the pockets against washers on the seatings. In these pockets the valves fit as in an ordinary cylinder. A large nut locks the yoke on the centre bolt. When the valves and the pockets are properly fitted there is no difficulty about holding the compression.

Petrol Substitutes.

I have a 3½ h.p. Green-Precision water-cooled engine with overhead valves, which is used with a combination sidecar. I should be glad if you would kindly tell me what kind of vaporiser could be fitted to this engine with satisfactory results. I think the Morgan would not be suitable. On applying to Messrs. Baker and Co. I was told that this engine would run well on paraffin (neat) if started on petrol, but I am doubtful. My Precision is fitted with an Amac carburetter.—H.N.

What you require is a hot jacket for the inlet pipe. This should extend from the engine to the carburetter, and can be supplied with heat from the exhaust by means of a pipe not less than ⅜in. internal diameter. Many such devices have been recently described in *The Motor Cycle.*

Obstinate Compression Taps.

I have the latest pre-war model of a well-known four-cylinder motor cycle, and find it is easier to start the engine from cold after injecting a few drops of petrol through the compression taps. My difficulty is that the compression taps are always seized up, so that I cannot turn them with the fingers, and I have to tap them with a hammer on the small end of the tap spindle, after which they turn quite easily. This is a trouble when starting, and some of the taps are difficult to get at. I should be very pleased to know of any remedy to prevent the taps seizing up.—H.S.G.B.

We should advise you to take the taps off and take them to pieces, then rub a little graphite on the points of contact, and do not screw them up too tightly. On the other hand, they should be so adjusted that there is no leakage.

Balancing.

I have just drilled the piston and connecting rod of my 3½ h.p. Triumph, and should be glad of your advice *re* balancing the engine for high speeds. Should weight be added to the flywheel opposite to the crank pin?—F.R.B.

As you have lightened your piston, weight should be taken from the flywheel rather than added to it. It is usual to balance the rotating and half the reciprocating masses. We issue a little booklet on the subject of balancing, price 6d., which we should advise you to obtain.

London-Winchester Roads.

Will you kindly state the present condition of the road to Winchester from here (London) *via* Staines, Egham, Basingstoke, and Alresford? Is it better than the alternative routes?—A.F.E.

Both roads to Winchester are bad in places. The road *via* Staines is good as far as Camberley, but absolutely execrable from Camberley to Basingstoke. It is good from Basingstoke to Kingsworthy, just outside Winchester. The Portsmouth Road is in practically first-class condition as far as Guildford, and on parts of the Hog's Back. Other portions of the Hog's Back are rough, and the road is really bad from Farnham to Alton. From there to Winchester it is reasonably good.

Using Paraffin.

I have a 2¾ h.p. 1915 model two-stroke, which I am running on substitute and paraffin oil. It is fitted with a Senspray carburetter (jet 28), hot air intake, and gauze cone in induction pipe. The cylinder has recently been decarbonised. After I have ridden about five or six miles at an average of about 25 m.p.h., the engine begins to overheat and to knock with the throttle open more than one-third. The knocking is more plainly audible when the decompressor is raised. I give it about half as much again of oil with substitute as I do with pure petrol, and as there is a three-way pipe to the cylinder and bearings, I think it cannot be underoiled. As the knocking does not take place before the engine gets warm, I should say it would not be due to play in the bearings. The spark is always fully advanced and full air is given. I use Vacuum T.T. oil. (1.) Can you suggest a reason for the knocking? (2.) What is the remedy? (3.) Will the hot air intake cause overheating? (4.) Would a smaller jet improve matters? (5.) Can the trouble be overoiling?—JOHN.

(1 and 2.) The knocking you refer to is due to the use of paraffin. It can be minimised by reducing the compression and retarding the spark (3.) A hot air intake will not cause overheating. (4.) A smaller jet might be a slight improvement. (5.) We do not think the trouble is due to overoiling, but simply to the nature of the fuel you are using, which is imperfectly vaporised. Paraffin ignites at a lower temperature than petrol and explodes very violently.

Heating the Air.

I am running my machine on a petrol substitute, and the engine on a ten-mile run gets too hot, much too hot if any hill is attempted. I notice on two occasions you advise heating the air. Is this better than heating the substitute, or would it be advisable to heat both the air and the substitute? I may say I can start from cold if I inject about a dessertspoonful of petrol.—A.S.

You may heat either, or both, but it is always advisable to take the air in warm. You can probably do with more air when you are using heavy fuel.

Eight-stroking.

In *The Motor Cycle* for March 29th, under "Current Chat," subtitle "Oversize Pilots—a Common Error," appears " . . resultant wastage and probably eight-stroking." I have spoken to a number of motor cyclists (readers of *The Motor Cycle*), who, like myself, do not know just what is meant by *eight* stroking, and would welcome an explanation for our edification.—H.J.B.

A two-stroke engine fires once in two strokes, and a four-stroke engine once in four strokes. When an engine fires only once in eight strokes, it is said to be "eight-stroking," that is, it is missing fire every other stroke. Too rich or too weak a mixture will cause this, especially when starting up from cold. Thus the engine may even twelve-stroke or more, indicating that the mixture requires readjustment, there being a long pause between each explosion, though the engine is turning over rapidly. Thus it will be seen that, although a four-stroke engine cannot two-stroke, it is apt to eight-stroke, just as a two-stroke is apt to four-stroke.

The N.S.U. Gear

I am fitting a second-hand N.S.U. gear to my machine. I have dismantled it and put it together again, and adjusted the bearings to a nicety, locking them in position with a screw before dropping the clutch into its place. (1.) When the clutch is in position and the springs and caps all screwed tightly up, is the high gear in engagement? It all revolves easily. (2.) On screwing up the control handle to the right when the cross-bar is half-way across the inclines of the fork, I can turn the shaft easily. Is that the free engine position? (3.) When I then screw the handle right up I find that the pulley will hardly move. Something seems to bind, and this is what is bothering me. What causes this binding? (4.) Will you please tell me what happens when the handle of the gear is turned? Are there two clutches? (5.) What is the function of the spring (like a piston ring) on the inner edge of the clutch? I have taken it out, and found a thin flat ring underneath.—F.H.

(1.) Yes, this is the high gear position; but as the gear revolves the clutch cones must be badly worn (this is an indication of considerable wear), provided the clutch spring has retained its tension and the bolt is not binding. (2.) Yes; this is the free engine position. (3.) When the operating handle is screwed up tightly (clockwise) the low gear is obtained. The belt pulley, however, cannot be revolved in this position if the axle is held at the same time. (4.) When the operating handle is turned slightly to the right the male clutch cone is withdrawn, which is the free engine position. The low gear is obtained by holding the sun wheel through the clutch ring, which is held against the outer clutch disc by means of the inner clutch disc. (5.) The spring is to keep the clutch ring in position.

NOTICE TO CORRESPONDENTS.

There have been several cases lately of correspondents asking for help and routes failing to enclose a stamped and addressed envelope, or omitting to give their full address. While we do not expect a stamped envelope to be enclosed by a foreign or colonial correspondent, it is impossible to deal with those queries which are insufficiently addressed. One reader from Bilbao neither gives his address nor signs his name. Should this paragraph catch his eye, we shall be pleased to deal with his query as soon as we receive the necessary information.

RECOMMENDED ROUTES.

SHEERNESS TO BRIGHTON.—W.E.

Sheerness, Queens Bridge, Key Street, Maidstone, Tonbridge, Tunbridge Wells, Crowborough, Uckfield, Lewes, Brighton.

LEICESTER TO BASINGSTOKE.—H.H.

Leicester, Lutterworth, Rugby, Southam, Banbury, Deddington, Kidlington, Oxford, Nuncham Courtenay, Dorchester, Wallingford, Streatley, Pangbourne (turn right), Tidmarsh, Aldermaston, Basingstoke.

WALSALL TO COLWYN BAY.—J.P.

Walsall, Bridgetown, Gailey, Crackleybank, Shrewsbury, Burlton, Ellesmere, Wrexham, Mold, Nannerch, St. Asaph, Abergele, Colwyn Bay.

CAMBRIDGE TO BATH.—H.F.F.

Cambridge, Royston, Baldock, Hitchin, Luton, Dunstable, Tring, Aylesbury, Thame, Wheatley, Oxford, Fyfield, Faringdon, Swindon, Wootton Bassett, Chippenham, Box, Bath.

BRISTOL TO CHELSEA (LONDON).—W.G.

Bristol, Marshfield, Chippenham, Calne, Beckhampton, Marlborough, Hungerford, Newbury, Theale, Reading, Maidenhead, Slough, Colnbrook, Hounslow, Brentford, Hammersmith Broadway, turn right for Putney, then straight down King's Road to Chelsea.

LONDON TO LYMINGTON.—F.C.M.

London, Putney, Kingston, Esher, Cobham, Ripley, Guildford, Farnham, Alton, Alresford, Itchen Abbas, Kingsworthy, Winchester, Hursley, Romsey, Cadnam, Lyndhurst, Brockenhurst, Lymington.

MALMESBURY TO TIVERTON.

A correspondent informs us that in riding from Frome to Taunton it is much better to go *via* Bruton, Castle Cary, Sparkford, and Langport than to pass through Shepton Mallet.

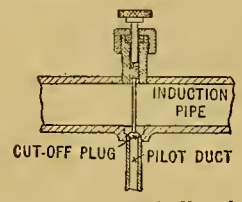
PATENTS

BY

ERIC W WALFORD.

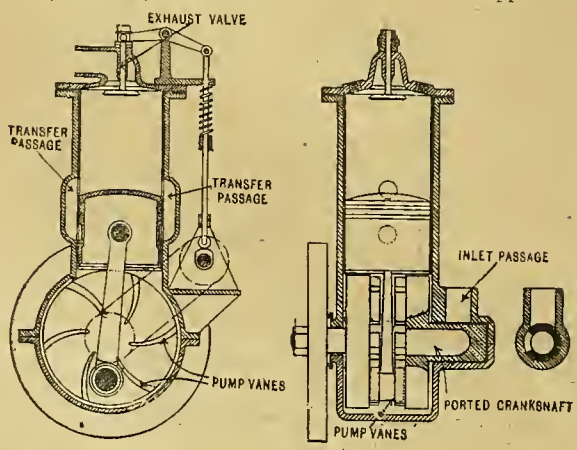
Pilot Jet Control.

In carburetters in which a pilot jet is employed there is usually no means for controlling the area of the duct containing the pilot jet. By the present invention the amount of mixture supplied by the pilot jet is adjustable, and may be cut off altogether if desired. This is effected by means of a plug carried on a spindle which passes through a gland mounted on the inlet pipe or carburetter body. The spindle has a screwed engagement with the interior of the gland, and when rotated by means of the knurled head it varies the passage from the pilot duct to the induction pipe.—M. Brechin, No. 103,358.



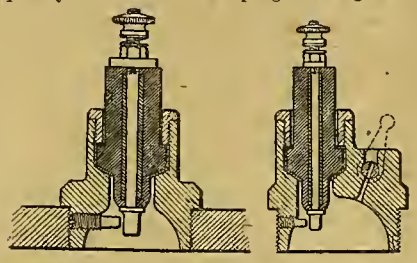
Two-stroke Improvements.

In this two-stroke engine the carburetter is attached to a boss on the crank chamber, and the charge enters the latter through the ported crankshaft. This, of course, occurs on up stroke of the piston, and to increase the volume of charge drawn in the flywheels are formed with pump vanes, which tend to set up a negative pressure in the centre of the crank case. A mechanically-operated exhaust valve is provided in the cylinder head, whilst at the lower end the cylinder is formed with transfer passages, which are opened when the piston is at the lower portion of its stroke, as shown. The exhaust valve is timed to open just before the transfer passages are uncovered, so that the exhaust gases pass off, assisted by the entry of the fresh charge. The exhaust valve normally closes in time to prevent the escape of any of the fresh gas, but it is mentioned that the valve cam may be adjustable so as to close late, thereby allowing the escape of some of the fresh charge and thus providing a variable compression effect.—J. H. W. Gill, No. 104,091.



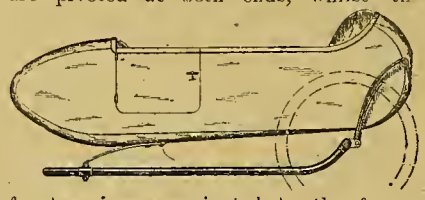
Combined Sparking Plug and Valve Cap.

Sparking plugs have for some time past settled down to more or less standard dimensions, but the invention here described provides a construction in which a larger insulator and more substantial electrodes can be used, without necessitating any structural alteration to the engine. To effect this, the sparking plug is combined with the valve cap, and as the valve cap is necessarily of generous dimensions there is plenty of room for a plug having substantial parts. In a further construction the valve cap also incorporates a priming cock, whilst the specification also illustrates a valve cap plug having two pairs of electrodes, and a combined valve cap, plug, and decompressor.—D. McGregor, No. 104,107.



Sidecar Suspension.

The drawing clearly illustrates an arrangement of springs which is found to give good results under load, and also to prevent excessive bouncing when the sidecar is empty. The rear springs are pivoted at both ends, whilst the front springs are pivoted to the frame, but attached rigidly to the body. Thus any movement of the body must distort the front springs, so that these act to prevent any undue freedom of movement.—F. W. Mead and T. W. Deakin, No. 104,086.



A Non-slipping Belt.

For the purpose of preventing belt slip there is employed a thread which is wrapped round the belt in the form of an open helix. This is done before vulcanisation, so that when finished the thread is embedded in the faces of the belt, and the coils are transverse to the direction of the drive.

The driving faces, therefore, consist of plain rubber broken by the lines of the thread. The thread consists doubtless of some flexible material having frictional resistance.—G. Warwick and A. P. Crouch, No. 104,076.

SPARKLETS

A Mechanical Horn for Motor Cycles.

F.R.S. Lamps, Pershore Street, Birmingham, are now producing a mechanical horn for motor cycles. It is of the push-down plunger type, the body being finished black. The F.R.S. is one of the few British-made mechanical horns, practically all the well-known makes coming from the States.

The Wincycle Co., Ltd.

The Wincycle Trading Co., of 106, Great Saffron Hill, London, E.C., are taking over the title of the Wincycle Co., Ltd. Mr. Arthur Whale, who has been with the company since 1899, will, we are told, still continue as general manager.

Ferodo Friction Surfaces.

Owing to the continually increasing cost of raw materials, the manufacturers of Ferodo fabrics have been compelled to advance the prices of these fabrics 15%, so that list prices are now plus 25% instead of plus 10% as hitherto. Should any difficulty be experienced in obtaining supplies, a postcard should be addressed to the makers, the Herbert Frood Co., Ltd., Chapel-en-le-Frith, Derbyshire.

Mudshield Material.

A sample of double-japanned imitation patent leather we have received from Messrs. W. D. Talbert and Co., 46, Sun Street, Finsbury Square, London, E.C.2, comes at an opportune time. Much has been said recently on the question of mudshields, and this particularly stout material will be found eminently suitable for the purpose, being so thick as to obviate any probability of cracking or cockling. We have also examined a sample of double-texture well-proofed twill, suitable for sidecar hoods and aprons. The fact that this material is used by the Daimler Co. is in itself a recommendation.

A Rust Preventive.

We have received a sample of Rustnot, which is a transparent rust preventive and protector for applying to steel, iron, copper, and aluminium surfaces. Any of our readers who may find it necessary to store their machines away for a time on account of petrol restrictions may find Rustnot of service. To apply it, the surface is first thoroughly cleaned and polished; one then wipes a very thin coating of Rustnot over the surface, using a clean cloth, when it should be allowed to dry for twenty or thirty minutes. When it is desired to remove the Rustnot for repolishing, one has to rub well with a cloth dipped in petrol or paraffin. This will remove the coating, and the metal can be polished in the usual way. The preparation can be obtained from dealers or direct from the Rustnot Co., 56, Victoria Buildings, Manchester.

Striking Evidence

A letter from our new booklet, 'TESTIMONY THAT TELLS,' recently published.

Mr. J. C. Anderson, of Leslie, Fifeshire, writes on March 13th, 1916 :—

"I cannot refrain from telling you how delighted I am with my 3 h.p. Royal Enfield. On Saturday last I rode 85 miles through snow of an average depth of 3 inches, and this morning I have come 15 miles through snow averaging 4 inches and drifts to a depth of 7 or 8 inches. The latter 15 miles is a regular journey every Monday morning with me, and although I have in the past eight years owned many different makes of motor cycles, I can truthfully say that not one of these could have done the journey (all uphill) that the Royal Enfield managed this morning without fuss or loss of time. Its weather-proofness was a revelation to me, an all-weather rider who in the past has had to provide home-made guards and belt shields of some kind for practically every machine, and it is indeed a pleasure to own a motor cycle which is independent of weather conditions."

Yours sincerely, J. C. ANDERSON.

Write for a copy of this new booklet. It gives the motor cycling experiences of many "Royal Enfield" riders, and is illustrated throughout in colour. Please mention "The Motor Cycle" when writing.

The ENFIELD CYCLE Co. Ltd.

REDDITCH .. and 48, Holborn Viaduct, E.C.

Contractors to His Majesty's Government, the French and Belgian Governments, and the Russian Imperial Military Authorities

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ____ & Co. ILIFFE & SONS Ltd., and crossed ____

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Spares; prompt delivery —Cyril Williams, Chapel Ash Depot, Wolverhampton. [1255

A.J.S. 1913 6h.p. Combination; £48.—Particulars, Harris, 48, Rattray Rd., Brixton, S.W. [1394

LATE 1914 6h.p. 3-speed A.J.S. and sidecar, exceptional condition; £53.—Else, Daisy Bank, Matlock. [X8771

1914 A.J.S. 6h.p. Combination, 3-speed, hand clutch, Sparton horn, 3 lamps, just thoroughly overhauled; £70.—Edwin Theakston, Bellfield West, Masham, Yorks. [X8774

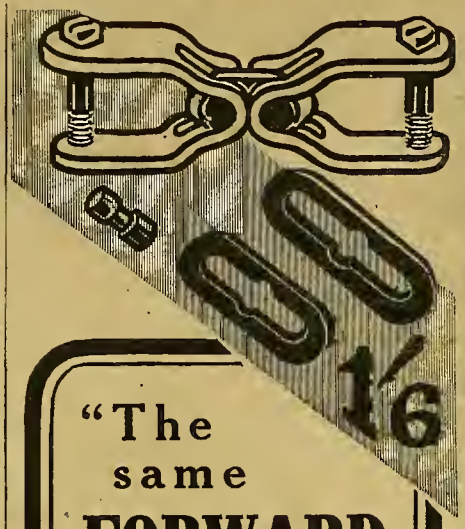
1916 4h.p. A.J.S. Twin, 3-speed, latest model, 2 lamps, horn, could be sold as new, run a few miles only, splendid condition; £72.—Robinson's Garage, Green St., Cambridge. [1542

LATE 1912 5h.p. A.J.S. and Sidecar, just overhauled, 3-speed, chain gear, clutch, and chain drive, kick start, lamp, horn, tools, etc.; £30.—Tait, Sons, and Pallant, Auctioneers, 23, Albert St., Rugby. [X8984

1916 4h.p. A.J.S. Combination, complete with spare wheel (new tyre), speedometer, tools, horn, mirror, lamps, generator, sidecar fitted with wind screen and storm apron; £90.—Steel, 11, Cumberland Place, Southampton. [1405

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796



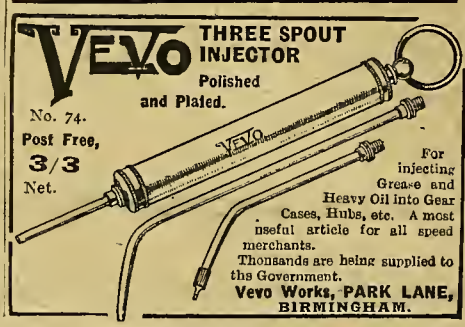
"The same **FORWARD FASTENER** still in use" —after nine months' strenuous Active Service.

That's a point in Pte. Sheard's experiences (reported in last week's "Motor Cycle") which further emphasizes the strength and entire dependability of the Forward Fastener, and establishes beyond question its claim to be

The Fastener that never fails—the strongest on the market.

Ask us or your Agent for full particulars.

FORWARD MOTOR CO.,
35, Forward Works, Summer Row,
BIRMINGHAM.


VEVO
THREE SPOUT INJECTOR
Polished and Plated.
No. 74.
Post Free, 3/3 Net.
For injecting Grease and Heavy Oil into Gear Cases, Hubs, etc. A most useful article for all speed merchants.
Thousands are being supplied to the Government.
Vevo Works, PARK LANE, BIRMINGHAM.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

Alldays.

ALLONS.—1917 2-speed models for immediate deliveries; £44/2.—Jones, Garage, Broadway, Muswell Hill. [9885

ALLDAYS Matchless, 1914, 2½h.p., 2-stroke, very reliable; £16/10, no offers; appointment.—Greatrex, Alpha, Ruskin Av., Waltham Abbey, Essex. [1377

RUNS on Paraffin.—Allon de Luxe, 1917, spring frame, 2-speed, clutch, kick start, mileage 400; cost £52, 42 gns.—Troward's, 78, High St., Hampstead. [1491

ALLDAYS Allons are actually in stock at Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N.22. Deferred terms, exchanges. [1498

ALLON.—All 1917 models in stock, 36-45 gns.; exchanges and deferred payments arranged.—Maudes', 100 and 136 Gt. Portland St., London, W. Tel.: 552 Mayfair. [7387

1913 Alldays Matchless, 3½h.p., 2-speed, free engine, handle start, petrol free, very good condition; £28; lady's cycle taken as part payment.—Barden, Beehive Lane, Chelmsford, Essex. [X8887

Ariel.

ARIEL, 3½h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [9211

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

ARIEL, the reliable motor cycle, 3½h.p. single, and 5-6h.p. twin models; delivery from stock.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0889

ARIELS.—1917 5-6h.p. combinations and 3½h.p. combinations for immediate deliveries; cash, deferred, or exchanges with up-to-date machines. Douglas preferred.—Jones, Garage, Broadway, Muswell Hill. [9886

ARIEL, 1916, 3½h.p., 3-speed countershaft, with sidecar, speedometer, 3 lamps, Stewart warner, luggage grid, perfect condition, real bargain, £55; also 1917 new model solo, £72/10; deferred payments, exchanges.—Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N.22. [1502

Auto Wheels.

GENUINE Wall Auto-Wheel, complete, new condition, splendid running order; £8/10.—Murray's, 37a, Charles St., Hatton Garden, Holborn. [X8811

Bat.

RUNS on Paraffin.—1912 Bat-Jap, 5-6h.p., 2-speed clutch, spring frame, perfect; 18 gns.; with 1915 underslung coach sidecar 25 gns.—Troward's, 78, High St., Hampstead. [1479

Bradbury.

4h.p. Bradbury, wicker sidecar, in good order; £25.—Tollafield, 75, Telford Av., Streatham Hill, S.W.2. [X8949

BRADBURY, 6h.p., 3-speed countershaft, 4,000 miles; £48/10, lowest.—Dowsing, 365, Brighton Rd., Croydon. [X8980

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage; £49/10.—Motor Exchange, Horton St., Halifax. [1455

BRADBURY, 3½h.p., 1913, Tourist Trophy Model, Senspray carburetter, watertight mag., machine in perfect condition throughout; for quick sale, bargain, £13/10.—Mebes and Mebes, 156, Gt. Portland St., W. [1443

MOTOR CYCLES FOR SALE.

Brough.

BROUGH, new 3½h.p., new, shop-soiled only, Sturmey gear box, semi T.T. bars, Lucas 462 black lamp t, Stewart horn, new spare tyre and belt, spare valves, ngs, etc.; cost £78; guaranteed as advertised; £57/10. Walter Matthews, 117, Suffolk St., Birmingham. [X8831

B.S.A.

COLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

1917 B.S.A., chain-belt, 3-speed model, slightly soiled; offers.—Box L3,477, c/o *The Motor Cycle*. [1425

B.S.A., 1917, chain-cum-belt model, been carefully used, excellent condition; £54.—Geo. Sharman, rackley. [X8815

B.S.A.—1917 Model H and K in stock; cash or deferred payments. — Jones, Garage, Broadway, uswell Hill. [9887

B.S.A. 1917 H and K Models in stock for immediate delivery; exchanges entertained.—Eagles and Co., igh St., Acton, London. [X8985

B.S.A. 1912 Free Engine Model, T.T. handle-bars, excellent condition, new appearance; £26.—Eagles ad Co., High St., Acton, London. [X8988

RUNS on Paraffin.—1915-16 B.S.A., 3-speed countershaft, coach sidecar, run under 4,000 miles; 53 as.—Troward's, 78, High St., Hampstead. [1487

B.S.A., 1915½, 3-speed, Mills-Fulford sidecar, 3 new Lucas lamps, mileage under 1,000 miles; £55.—Horsman, 55a, East Rd., Kingston-on-Thames. [X8979

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, ost paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529

B.S.A., 4¼h.p., 1914 model, 3-speed countershaft, Klaxon, lamp, tools, tyres perfect; owner France; 37.—Hammond, The Firs, Romford, Essex. [X8946

B.S.A. 4¼h.p. Model K, late 1915, 3-speed countershaft gear, with Millford coachbuilt sidecar, fine ondition; £57.—Eagles and Co., High St., Acton, Lon-on. [X8986

B.S.A., 4¼h.p., 3-speed Model K, new September, 1917, done about 1,000; expert examination; fficer Overseas; £50, nearest.—Apply, Campion, High t., Grantham. [X8993

B.S.A., 1912,-3 Free Engine Model, Dunlop heavy tyres, unscratched, N.S.U. 2-speed gear, with adjustable pulley, accessories; £30.—Eagles and Co., High t., Acton, London. [X8987

B.S.A., 1916, chain-cum-belt, 3-speed countershaft, kick starter, Covey speedometer, lamps, T.T. handle-bars, only done 3,500 miles, very good condi-on, many spares; seen any time; £54.—Foster C rmes, Kingston Russell, Dorchester. [X8973

B.S.A., 1914, very late, 4h.p., all chain model, with best B.S.A. sidecar, 3 lamps, watch, Stewart horn, ondition A1, real good thing, £57/10; also a 1917 new l chain model and belt-cum-chain model, just arrived; xchanges, deferred payments.—Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, 22. [1501

1916 B.S.A., all chain drive, 3-speed, clutch, and kick starter, fitted with a light sidecar, includes l accessories, £60 the combination, guaranteed; also lo B.S.A. machine, all chain drive, and chain-cum-belt, l guaranteed in condition as new, at from £50, easy ayments, or exchange entertained.—Wauchope's, 9, Shoe ane, London. [1563

Calthorpe

NEVER Been Ridden.—Calthorpe Junior; £20.—Davison, 182, Marylebone Rd., N.W.1. [1387

COLMORE Depots, Birmingham, Manchester and Liverpool, for Calthorpe motor cycles. [0799

1916 Calthorpe-Precision, 2¾h.p., can hardly tell from new; £25.—Jones, Garage, Broadway, uswell Hill, N.10. [1165

CALTHORPE, 2-stroke, 2-speed, 1917 model; listed £34/13; brand new; owner unable to take delivery; what offers?—Box L3,446, c/o *The Motor Cycle*. [1229

CALTHORPES. Get them at Lamb's; they are actually in stock; exchanges, deferred payments.—151, igh St., Walthamstow, E.17, and 50, High Rd., Wood reen, N.22. [1496

J. EVANS, Birmingham and District Agent.—Calthorpe 1917 models in stock; two-stroke and ur-stroke lightweights, and 4-5h.p. twins, solo or as ombination.—John Bright St. [1584

CALTHORPE, 1915, 2-stroke, 19 gns.; and 1916 J.A.P., 2-speed model, £24/10; deferred terms no xtra.—Lamb's, 151, High St., Walthamstow, and 50, igh Rd., Wood Green, N.22. [1505

CALTHORPE-J.A.P. (new October, 1915), 2¾h.p., 4-stroke J.A.P. engine, Enfield 2-speed gear, brand ew 26×2 Dunlop tyres, black and gold finish, lamps id horn, automatic Inbricator, in perfect condition; 27.—The Premier Motor Co., Aston Rd., Birmingham. [1531

Chater-Lea.

1917 Chater-Lea 2-strokes in stock for immediate delivery, £41; 2-speed countershaft models.—ones, Garage, Broadway, Muswell Hill, N.10. [1166

Chater-Jap.

8h.p. Chater-Jap Combination, automatic inlet valves, Bosch, 2-speed countershaft, chain drive, new tyres, bes; £20; appointment.—75, Pellatt Grove, Wood reen, London. [X8991

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ENFIELD 6 h.p. Combination (Standard). (2-seater £3 extra.)	£94 10
HARLEY-DAVIDSON, 7-9 h.p., Standard Combination	£115 10
HARLEY-DAVIDSON 7-9 h.p. Comb., elec. equipment	£126 10
HARLEY-DAVIDSON 7-9 h.p. Sporting Combination	£117 10
LEVIS, 2½ h.p., 2-sp., Enfield gr., rustless rims	£47 10
LEVIS, 2½ h.p., Popular model	£32 0
ROYAL RUBY, 2½ h.p., single-speed	£47 5
ROYAL RUBY, 2½ h.p., 2-speed	£40 0
ROYAL RUBY, 2½ h.p., 2-speed J.A.P.	£46 0
ARIEL, 2¾ h.p., 3-sp., kick-start, solo mount	£72 0
NEW HUDSON, 2¼ h.p., 2-speed, Model C.	£38 0
CALTHORPE-J.A.P., 2¾ h.p., 2-speed	£39 16
HARLEY-DAVIDSON 7-9 h.p. 1916 Comb., H.-D. bulbous back Sidecar	£105 0
ENFIELD 6 h.p. Tradesman's Outfit, slightly soiled	£90 0

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JAMES, 4½ h.p., 1915, 3-sp., kick-start, 2 lamps horn	£51 0	£57 10
ENFIELD 6 n.p. 1916 Comb., Lucas access., beautiful order	—	£85 0
REX 6 h.p. 1913 twin, coach Com.	£31 10	£39 10
NEW HUDSON, 4 h.p., late 1913, and N.H. S-car, speedometer, windscreen, lamps	£35 0	£39 10
BRADBURY, 3½ h.p., 1912, 2-sp.	£18 10	£22 10
ROVER, 3½ h.p., 1913, Philipson pulley, 2 lamps, horn	£31 0	£35 10
T.D.C., 2½ h.p., 1916, 2-sp., original tyres, bargain	£20 0	£25 0
ROVER, 3½ h.p., dry cell ignition	£5 0	£7 10
ARIEL, 3½ h.p., 3-sp., c-shaft, k-start, Ariel S-car, 3 lamps, horn, Stewart luggage grid.	£55 0	—
B.S.A., 4½ h.p., late 1914, 3-sp., k-start, best B.S.A. S-car, 3 lamps, horn, watch, speedometer, windscreen, cond. As.	—	—
A.J.S., 2¾ h.p., 1915, 3-sp., k-start, all accessories	£40 0	£42 0
P. & M., 3½ h.p., 1913, 2-sp. gear, all access., nearly new tyres	£29 10	£33 10
JUNO-VILLIERS, 2½ h.p., 1916, all access., mileage about 100	£30 10	£33 10
ALLDAYS ALLON, 2½ h.p., 2-sp., clutch, all access.	£31 0	£36 10
ALLDAYS ALLON, 2½ h.p., 2-sp., 1915, single-speed, and access.	£21 10	£27 10
AUTO-WHEEL, 1 h.p., B.S.A. model	£12 12	£13 13
AUTO-WHEEL, 1 h.p.	£6 10	£7 10
RADCO, 1914, single-speed	£14 10	£16 10
HARLEY-DAVIDSON, 7-9 h.p., 1915, 16F model, new coach Sidecar, all accessories	——	£72 10
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CALTHORPE, 2¾ h.p., 1915, 2-str., and accessories	£19 19	£21 10
CALTHORPE - J.A.P., 2¾ h.p., 1915, 2-sp., all accessories	—	£24 10
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MOTOR CYCLES FOR SALE.

Chater-Lea-Jap.

8h.p. 1916 Twin-cyl. Chater-Lea-Jap Motor Cycle, 3-speed countershaft gear, free engine, and handle starting fitted with 2-seated tandem superior coachbuilt sidecar, Pillion seat, 700×80 Palmer cord tyres to all wheels, very little used, superior quality upholstered extra seat on back, large pan saddle, carrier, mica screen, storm apron, all accessories to complete; 75 gns.; guaranteed.—Wauchope's, 9, Shoe Lane, London. [1569

Clyno.

CLYNO 1912 6h.p. Combination; £35/10.—Motor Exchange, Horton St., Halifax. [1457

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

Connaught.

CONNAUGHT, 1914, 2¾h.p., 2-stroke, 3-speed, lamps, 130 m.p.g.; satisfactory reason; £18.—118, Ravensbourne Av., Shortlands, Kent. [1539

BIRMINGHAM Agent, P. J. Evans, John Bright St.—1917 models of the famous Connaught two-stroke, standard 2¾-3h.p. models, either solo or with sidecar; miniature models, single or 2-speed countershaft gear; prices from 27 gns. [1583

Coventry Eagle.

COVENTRY Eagle, 2-stroke, 1915, good order; £23.—47, Clock House Rd., Beckenham. [1339

COVENTRY Eagle 1916 Twin, sidecar combination, 3-speed countershaft; £69/10, or exchange for Morgan.—Holdsworth, 22, Belvoir Gardens, Halifax. [1456

Dalm.

DALM, 1915, T.T., 2-stroke, as new; £20.—51, Maplethorpe Rd., Thornton Heath, S.E. [1390

De Dion.

DE DION Motor Cycle and Sidecar, B.B., and mag., sound; £14, near offer.—72, Beechfield Rd., Tottenham. [1340

Diamond.

1914 2¾h.p. Single-cyl. Diamond, shaft drive, h.b.c. clutch, countershaft 2-speed gear, low saddle position, original tyres hardly worn, not done more than 500 miles, and guaranteed perfect; £28.—The Premier Motor Co., Aston Rd., Birmingham. [1532

Douglas.

1917.—Gibb, Douglas Expert, Gloucester, for earliest deliveries of The Motor Cycle. [X8510

1913 T.T. Douglas, 2¾h.p., 2-speed, tyres as new; 28 gns.—Railway Garage, Staines. [1506

DOUGLAS, 1914, T.T., 2-speed, good condition; £38.—Nelson, 14, Cottage Rd., Headingley. [1431

DOUGLAS, about 1911; £13, offers; must sell.—Bates, 247, King's Rd., Kingston-on-Thames. [X8817

1914 (Late) Douglas, Model U, most carefully kept; exceptional order; £38.—Railway Garage, Staines. [1507

DOUGLAS, 4h.p., 1916, 3 speeds and clutch, lamps, horn, tools, perfect order.—Maclean, Dairy, Ayrshire. [1428

DOUGLAS, 1913¾, 2¾h.p., 1917 condition, never overhauled; £32.—Officer, 49, High St., Kingston-on-Thames. [X8818

DOUGLAS, 1913, 2¾h.p., T.T. model, 2-speed, in splendid condition; 30 gns.—34, Ashvale Rd., Tooting, S.W.17. [1404

DOUGLAS, 2¾h.p., 1915, 3-speed, new condition, all accessories; £45.—Noyes, 4, Collingbourne Rd., Shepherd's Bush. [1401

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Yeovil, Tel.: 50. [5855

1911 2-speed Douglas, in perfect order, guaranteed, overhauled; £21.—Jones, Garage, Broadway, Muswell Hill, N.10. [9904

DOUGLAS, 1914, 2¾h.p., 2-speed, and clutch, little used; £40; seen London; private.—Box L3,490, c/o *The Motor Cycle*. [1516

2¾h.p. Kick Start and Clutch 2-speed Model Douglas, 1912 model; £25; guaranteed.—Wauchope's, 9 Shoe Lane, London. [1562

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

1914 Douglas, 2-speed, Stewart speedometer, P. and H. lamp set, nearly new condition; £38.—Rivett, 236, High Rd., Leytonstone. [X8890

DOUGLAS Motor Cycles, 1914 or 1915; state full particulars and lowest price for spot cash.—Harold Petty, 32, King St., Leicester. [X8732

DOUGLAS, 1913-14, 2 speeds, fully equipped, a beauty; £32; cheaper machine part.—136, Dalmally Rd., Addiscombe, Croydon. [1408

DOUGLAS Motor Cycle, late 1916, 2¾h.p., 2-speed gear, has only run 1,000 miles, as good as new; price £45.—Goodwyn, Bovey Tracey. [1432

DOUGLAS, 1914, 2-speed, 2¾h.p., kick start, acetylene lamps, horn, speedometer, very good order; £45.—Williams, Farley Lynches, Luton. [1527

MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS, 2¾h.p., latest War Office Model, 3-speed, speedometer, etc., complete, run about 400 miles; £52/10.—Wm. Rootes, Hawkhurst, Kent. [1427

1914½ Douglas, 2¾h.p., 2-speed, fully equipped, excellent condition throughout; 31 gns.—Lionel Kington, 245, Hammersmith Rd., London, W. [1380

1914 2¾h.p. T.T. Douglas, Lucas lamps and horn, new tyres and belt, excellent condition; £38.—Brigg, 98, Kenilworth Av., Wimbledon Park, S.W. [1350

1915 Douglas, 2¾h.p., W Model, bought new 1916, lamp, speedometer, horn, spares, just overhauled; owner going Overseas; £40.—Apply, McNaught and Co., Ltd., Worcester. [1554

1915 2¾h.p. Douglas, 2-speed, semi T.T. bars, 2 Lucas lamp sets, Watford speedometer, horn, etc., in perfect mechanical order; £50.—Robinson's, Garage, Green St., Cambridge. [1541

DOUGLAS, 2¾h.p., 1915, 2-speed, Colonial T.T., Lucas lamps, Sparton horn, Cowey speedometer, Dunlop tyres (unpunctured), long exhaust, footboards, perfect mechanical condition; £42; appointment.—Brown, 12, Hanworth Rd., Feltham, Middlesex. [1494

1915¾ 4h.p. Douglas Colonial 3-speed Combination, C.A.V., P. and H., Lucas, special 3-jet Binks, under 1,500, splendid condition, powerful, polished aeroplane exhaust, complete with petrol, etc., for 2,500 miles; £64, offer.—Rectory, Streatham, S.W. [1413

LATE 1915 Douglas 2-speed T.T. Colonial Model, all black, large, long extended exhaust pipe, Lucas horn, P. and H. head (large), rear lamp, etc., footboard or footrest optional, in real good order, guaranteed perfect; £45.—Jones, Garage, Broadway, Muswell Hill. [9888

2 3h.p. Douglas, latest models, including W, clutch, 4 kick start, U touring, V racing; special arrangements to supply doctors and farmers immediately against Minister Munitions certificate. Full particulars and how to obtain them, Robinson's Garage, Green St., Cambridge. [1544

DOUGLAS, 1914, 2¾h.p., 2 speeds, fitted with mud shields, improved mudguarding, long exhaust pipe, Lucas horn, acetylene head lamp, the whole in excellent condition, engine recently overhauled, perfect mechanically; cash offers invited.—Relton, Maid's Head Hotel, Norwich. [1423

1915 Douglas Motor Cycle, 2¾h.p., 3-speed Colonial Model V, Watford 3 gn. speedometer, F.R.S. lamp, 800ft. beam, long mechanical horn, A.K. kneegrips, long exhaust pipe and cut-out, has only run 4,800 miles; cost £58, sell £45.—Apply, A. W. B. Hatton-Ellis, Heath Lodge, Nacton Rd., Ipswich. [1286

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012

EDMUND-J.A.P., 2¼h.p., 2 speeds, the wonderful spring frame machine. We can deliver from stock; price 50 gns.; detailed list free.—The North Wales Motor Exchange, Holt St., Wrexham. [X8755

Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2¼h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

ENFIELD 1915 6h.p. Combination, almost new; £58. —29, St. Leonard's St., Bow. [1366

1914 Enfield Combination, 6h.p., nice order; £52.—Ross, 86, High Rd., Lee, S.E. [1370

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

BRAND New Enfield 6h.p. Combination, very latest model, in stock; £94/10.—Pepper's Garage, Shelton, Stoke-on-Trent. [X8578

1917 6h.p. Enfield Combination, also 3h.p. 2-speed models from stock.—Jones, Garage, Broadway, Muswell Hill, N.10. [9905

ENFIELD 1916 3h.p. Twin, 2-speed, lamps, horn, speedometer, etc., and Canoelet Minor sidecar, very little used; £57.—Below.

1915 Royal Enfield Combination, 6h.p., lamps, horn, wind screen, good condition; £60.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

LATE 1914 Enfield Combination, lamps, trip speedometer, etc., excellent condition; 55 gns.—436, Whitehorse Rd., Thornton Heath. [1551

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock for immediate delivery.—See below.

1917 6h.p. Enfield Coachbuilt Combination, with apron and mat, 2 speeds, clutch and starter, 90 gns.; extra for hood and screen, £4/19.—Below.

1917 3h.p. Enfield, solo or sidecar mount, 2 speeds, clutch, and kick starter; 55 gns.; sidecars from 7 gns.—Below.

1917 Enfield Two-stroke, 2¼h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright St., Birmingham. [1582

ROYAL Enfield, 6h.p., Sept., 1916, and sidecar, equal to new, Lucas lamp, Cowey speed indicator, etc.; bargain, £95.—Reeves, Garage, Purley. [1446

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26×2 de Luxe	12/6	15/6
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26×2½ de Luxe, heavy	20/-	32/-
26×2½ de Luxe, extra heavy	23/6	34/-
26×2⅝ de Luxe, heavy	21/-	30/6
26×2½×2¼ de Luxe, extra he'vy	25/-	36/6
26×2½×2¼ Dreadnought	31/6	40/-
26×3 for 2½ rim, A Won, st'd'ed	21/-	38/-
700×80 3-ribbed Dreadnought	35/-	48/-
28×3 de Luxe, heavy	35/-	48/-
KEMPSHALL :		
26×2¼ heavy anti-skid	21/-	32/-
26×2½ heavy non-skid	38/-	48/-
28×2½×2¼ heavy, for Indians	25/-	48/3
28×3 anti-skid	27/6	57/6
28×3 anti-skid	20/-	36/-
BATES :		
26×2¼ No. 1 special heavy	28/6	44/-
26×2½×2¼ No. 1 special heavy	32/6	49/6
26×2½ No. 1 special heavy	32/6	49/6
28×3 No. 1 special heavy	40/-	63/6
MICHELIN :		
26×2¼ heavy Trident	21/6	30/-
26×2½ heavy Trident, wired on	21/-	32/-
PEDLEY :		
26×2¼ 3-ribbed medium	21/-	37/6
26×2¼ 3-ribbed extra heavy	30/-	43/-
26×2⅝ 3-ribbed extra heavy	31/-	44/-
26×2½×2¼ 3-ribbed extra hea'y	31/-	48/-
26×2½ 3-ribbed extra heavy	31/-	48/-
26×2½ for 650 rim, 3-ribbed extra heavy	33/6	50/6
26×3 for 2½ rim, 3-ribbed extra heavy	33/6	77/-
26×3 for 650 rim, 3-ribbed extra heavy	34/-	72/6
28×3 3-ribbed extra heavy	38/-	67/6
WOOD-MILNE :		
26×2½×2¼ Grip-ribbed	22/6	32/9
26×2½ Grip-ribbed	20/-	31/6
26×2½ Grip-ribbed extra heavy	25/-	41/-
28×3 Grip-ribbed	27/6	44/-
TUBES.—Continental, Elite, etc.		
24×2	4/3	
26×2	4/6	6/9
26×2¼	5/6	7/9
26×2¼	6/6	7/9
26×2⅝	5/9	8/3
26×2⅝	6/9	8/3
26×2¼×2¼	5/9	8/9
26×2½×2¼	6/9	8/9
26×2¼	5/6	8/9
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28×3	9/6	11/9
650×65	5/6	10/-
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8ft. 6in. × ⅞in. lengths only	7/-	13/9
Midland Patent Wire Core.	Per foot.	List Price.
1¼in. section	1/6	2/9
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Best English Make.		
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MOTOR CYCLES FOR SALE.

Enfield.

1913-14 Enfield Combination, coach sidecar, £49/10; 1912 Enfield combination, cane sidecar, £39/10.—Motor Exchange, Horton St., Halifax. [1458

ENFIELD Combination, 6h.p., 1913, owner driven, fully equipped, perfect running, new tyres; selling because of war; £50.—Wild, Longford, Middlesex. [1434

ENFIELD Royal, new, but slightly showroom soiled, 8h.p. coach combination, screen, dust cover, grid, Palmer tyres, and accessories, just cost £105, accept for quick sale £80.—Grist, 127, Fulham Rd., London. [1231

6h.p. 1916 Royal Enfield Combination, handsome coachbuilt sidecar, beautifully upholstered, complete with all accessories, and in condition almost like new; 75 gns.—Wauchope's, 9, Shoe Lane, Fleet St., London. [1570

ENFIELD Motor Cycle Combination for sale, 1916, fitted with a D.A. acetylene lamp set, speedometer, horn, spare tyre, condition equal to new.—Rugby Motor Engineering Co., Central Garage, Little Church St., Rugby. [1515

ENFIELD 2¾h.p. Twin, late 1913, free engine, 2-speed gear, latest B. and B. carburetter, compensating engine sprocket, lamp, horn, etc., tyres and condition generally excellent; bargain, £26.—Elsey, 6, Windsor Rd., Southall. [X8994

ENFIELD 6h.p. Combination, £94/10; also 2¼h.p. 2-speed lightweight, £44/2; 1916 6h.p., Lucas accessories, splendid order; £85; deferred payments if desired.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N.22. [1504

ENFIELD, 1916 (August), 3h.p., T.T., 1917 Binks carburetter, hot air intake, heated induction pipe, auxiliary tank, electric head and tail lamps, two 20 hour accumulators, mechanical horn; £50.—Holmes, Holme Lodge, Cottingham Rd., Hull. [X8888

ENFIELD Combination, 8h.p., 1915, run less than 2,200 miles, cleaned and overhauled by Enfield Co. at 2,000 miles, speedometer, horn, no lamps, carefully used, practically new; £66 cash; to be seen by appointment only.—John Waterer, Bagshot, Surrey. [1540

Excelsior.

RUNS on Paraffin.—1917 British Excelsior, 2-speed, clutch, 2-stroke, run 400 miles; 28 gns.—Troward's, 78, High St., Hampstead. [1478

EXCELSIOR, 2¼h.p., 1917, 2-stroke, 2-speed, only used 10 miles, with barrel of petrol substitute; cost £46, will accept £39 the lot.—Box L3,445, c/o *The Motor Cycle*. [1228

BRAND New Latest Model 7h.p. 3-speed American Excelsior, with new type automatic lubricator, dual control to clutch, 28×3 tyres, etc., complete with Montgomery coachbuilt sidecar, enamelled to match, £90; or with special Model de Luxe sidecar, with luggage and petrol can carrier, adjustable wind screen, etc., £95; liberal exchanges; delivery free to any address.—To be obtained only from the Premier Motor Co., Aston Rd., Birmingham. [1533

Forward.

FORWARD, 2¾h.p., twin-cyl., mechanically perfect, Bosch, Amac; £20, or offer.—49, Brownlow Hill. [X8977

F.N.

5-6h.p. F.N., like new, dropped frame, watertight mag., 2 speeds, clutch; £28; exchange Douglas.—82, York Rd., Battersea. [1357

F.N., 4 cyls., automatic feed, 1908, 8h.p., with basket sidecar, lamps, and accessories, £25; also Chater-Lea and sidecar, £50.—Stone, Butcher, Chiswick. [1526

Grandex.

RUNS on Paraffin.—Brand new 1917 Grandex-Villiers, 2-speed, 2-stroke; list 38 gns., to clear 28 gns.—Troward's, 78, High St., Hampstead. [1480

Green.

GREEN-PRECISION, w.c., 3¾h.p., 1914, Canoelet sidecar; £35.—Clare, Ravensden, Beds. [1256

Harley-Davidson.

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Harley-Davidsons, delivery from stock. [9677

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802

LATE 1915 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0861

HARLEY-DAVIDSON 1915 7-9h.p. Combination, new tyres, all accessories, condition as new; £65.—4, Criterion Buildings, Windsor Bridge, Thames Ditton. [1373

HARLEY-DAVIDSON, 1917, 7-9h.p., 3-speed, Model 17F, Harley sidecar, with wind screen, lamps, horn, brand new spare tyre, magnificent outfit, as new in every respect; £102.—Below.

HARLEY-DAVIDSON, new 1917 models in stock, 7-9h.p., 3-speed Model 17F, £93; also one new 1916 Model 16F, £84; sidecars to match; cash, exchange, or extended terms quoted.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. 'Phone: Avenue 5548. [0551

BRAND New Harley-Davidson, with handsome Canoelet sidecar, all finished to match, price £98; also one used for demonstration purposes, £78.—Pepper's Garage, Shelton, Stoke-on-Trent. [X8576

MOTOR CYCLES FOR SALE.

Harley-Davidson.

HARLEY-DAVIDSONS.—Immediate delivery; new magneto models, £84/15; several second-hand 1915 and 1916 combinations from £65; exchanges arranged —Colmore Depots, 31, Renshaw St., Liverpool, and 211 Deansgate, Manchester. [0885

7-9h.p. Harley-Davidson, 1916 model, fitted with coach built sidecar some make, lamp, tools, and all accessories to fit, Pillion seat, storm apron, very little used; 80 gns.; guaranteed.—Wauchope's, 9, Shoe Lane Fleet St., London. [1561

HARLEY-DAVIDSON 7-9h.p. 1915 11J Combination, electrically equipped, Stewart speedometer, etc., Swan 20-gn. sidecar, all in splendid condition; what offers?—A.B., 39, Westbourne Terrace North, Paddington, W. 'Phone: Padd. 3418. [X8809

BRAND New Model 11F 7-9h.p. 3-speed Harley-Davidson, 28×3 Goodyear rubber studded tyres fitted with special spring chassis, American model Montgomery sidecar, enamelled to match, complete; £90; the last one at this price.—The Premier Motor Co., Aston Rd., Birmingham. [1554

1915 Model 11F 7-9h.p. 3-speed Harley-Davidson, 28×3 Hutchinson extra heavy 3-ribbed tyres, appearance as new, in good condition throughout; £50 or with brand new Montgomery coachbuilt sidecar, enamelled to match; £65.—The Premier Motor Co., Ltd. Aston Rd., Birmingham. [1553

HARLEY-DAVIDSON Sporting Outfit actually here with Swan torpedo sidecar, T.T. handle-bars 117/10; also electric model, with C. sidecar, £126/10; one without electric equipment, but with B. sidecar 115/10; 1916 model, with bulbous back sidecar (H.D.) 105; 1915 plain model, with H.D. Canoelet sidecar, 3 lamps, Stewart warner, speedometer, £72/10; deferred payments if desired; liberal exchanges.—Lamb's, 151 High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N.22. [1503

Hazlewood.

RUNS on Paraffin.—1914 6h.p. Hazlewood-Jap, 3-speed clutch, kick start, countershaft drive, Bramble 6 gn. underslung coach sidecar; 42 gns.—Troward's, 8, High St., Hampstead. [1481

Hobart.

1913 Hobart, 3½h.p. J.A.P. engine, Villiers F.E clutch, practically new tyres, excellent condition throughout; £20.—Rampling, 15, Bramford Lane, Ipswich. [X8803

Humber.

1911 3½h.p. Humber; £15/10.—Motor Exchange Horton St., Halifax. [1465

1915 Humber Lightweight, like new; £11, offers.—35 Colwell Rd., E. Dulwich. [1349

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882

1914 3½h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0867

3½h.p. Humber, sidecar, 2-speed, handle start, perfect condition; great bargain, £22.—182, Hainault Rd., Leytonstone. [1362

HUMBER, 1917, 4h.p., flat twin, and sidecar; £75 or exchange.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [1452

HUMBER, 2-speed model, standing start, nice, smart machine, property of a gentleman left on sale; £25 cash, or easy terms.—Wauchope's, 9, Shoe Lane, London. [1566

Indian.

INDIAN, 1915, 5h.p., 3-speed, semi T.T. bars, lamps horn, etc.; £42.—Below.

INDIAN, 1915, 3½h.p., 3-speed, semi T.T. bars, with sporting wicker sidecar; bargain, £40.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491

INDIAN 7-9h.p. Combination, perfect order; offers.—42, Perran Rd., Tulse Hill, S.W.2. [1351

1915 Indian, 5h.p., 3-speed, little used, Lucas lamps, horn, tools; £43.—Keable, 111, High St., Guildford, Surrey. [1227

INDIAN, 5-6h.p., red, 2-speed, clutch, electrical equipment, 1912; £25.—Barlow, 97, Ainsworth Rd., Radcliffe, Lancashire. [X8767

LATE 1915 7-9h.p. Indian Combination, 3-speed, clutch, spring frame, as new, mileage 1,500; any trial; £68.—W. Cox, Shillingstone, Dorset. [1346

INDIAN, 1916, 5h.p., 3 speeds, clutch, kick starter model, semi T.T. bars, guaranteed new condition; 7 gns.—P. J. Evans, John Bright St., Birmingham. [1585

INDIAN, 1915, 5h.p., 3-speed coachbuilt combination, clutch and kick starter, usual accessories, good condition; £58.—P. J. Evans, John Bright St., Birmingham. [1586

LATE 1915 7-9h.p. Indian and Millford sidecar, 3-speed, spring frame, electric light, disc wheels, clutching turnout; £55.—Lieut. Moulds, Fairseat, Deepcut, Hants. [1391

RUN on Neat Paraffin.—Indians, 1911, 5h.p., 20 gns.; 1913 T.T., 7-9h.p., 2-speed, spring frame, 32 gns.; 1913 T.T., 7-9h.p., 2-speed, clutch, 32 gns., re-enamelled; 1915 7-9h.p. road racer, clutch, 38 gns.; Phœnix Indian coachbuilt sidecar, 1916, 18 gn. model, as new, 12 gns.—Troward's, 78, High St., Hampstead. [1477

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MOTOR CYCLES FOR SALE.

Ivy.

RUNS on Paraffin.—1915 Ivy, 2-speed, 2-stroke; 24 gns.—Troward's, 76, High St., Hampstead. [1482

James.

COLMORE Depot, 261, Deansgate, Manchester, have in stock complete range of James motor cycles [0803

JAMES 2-strokes, 1917 models, for immediate delivery.—Colmore Depot, 211, Deansgate, Manchester. [0888

JAMES, 1913, 86×96, countershaft gear, and coach sidecar; £39/10.—Motor Exchange, Horton St., Halifax. [1459

BRAND New James Combination, 4½h.p., with 3-speed gear, actually in stock; £86.—Pepper's Garage, Shelton, Stoke-on-Trent. [X8577

1916 4½h.p. James Combination, mileage 300, 3 lamps, speedometer, horn, many accessories, sidecar silencer, splendid condition; bargain, £65.—Wharncliffe, Bexley. [1436

JAMES Combination, 1915, 4½h.p., 3-speed, all chain drive, lamps, horn, speedometer, etc., good condition; £50.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481

JAMES 4½h.p. Coachbuilt Combination, 1914, 3-speed countershaft, splendid condition, speedometer, accessories, just overhauled by makers; £46/10.—Off Licence, Trumans Rd., Stoke Newington. [1400

JAMES, 1917 models, for immediate delivery from stock. Big "Four" combinations, with and without Lucas dynamo lighting set; 3½h.p. twin, and two-stroke models.—P. J. Evans, John Bright St., Birmingham. [1580

1915 James Combination, 4½h.p., Big Single, countershaft 3-speed gear, enclosed chain drive, kick starter, nearly new Dunlop tyres, James Canoelet coachbuilt sidecar, lamps, and horn, appearance and mechanical condition as new; £55.—The Premier Motor Co., Aston Rd., Birmingham. [1536

J.A.P.

1912 J.A.P., 4h.p., and sidecar, P. and M. 2-speed, Bosch, Druids, B. and B., accessories; trial: £32/10; perfect order.—3, Denmark Rd., Camberwell. [1374

Kerry.

2¾h.p. Kerry, mag., Binks, fine order; £7/10.—36, Northumberland Av., Wanstead Park. [1396

Levis.

LEVIS, 1915, 2¼h.p. Popular, splendid condition; £18.—13, East Dean Rd., Eastbourne. [1375

COLMORE Depots, Birmingham and Leicester, for delivery of all models of Levis motor cycles from stock. [0804

LEVIS Baby, 1915, Bosch, 130 m.p.g., excellent condition; 20 gns.; seen by appointment.—69, Station Rd., Finchley. [1386

FOR Sale, or exchange to value, Baby Levis, in splendid condition; price 20 gns.—Bramboro' View, Donisthorpe, Ashby-de-la-Zouch. [X8978

BARGAIN, £20.—Levis test machine, engine just overhauled by makers, perfect running, fitted with the new disc wheels.—Mitchell, Wem. [X8982

LEVISES are actually in stock at Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N.22. Deferred terms, exchanges. [1499

LEVIS Popular, 1916, Albion 2-speed, all accessories, fast, economical, appearance, condition perfect; £23.—Hampton, 10, Broadhinton Rd., Clapham, S.W. [X8712

Martin.

1914 T.T. Martin, 8h.p., o.h.v. J.A.P. engine, Jardine countershaft 2 speeds, hand clutch, exceptionally fast, excellent condition; £40.—W. Hayward, High St., Rainham, Kent. [X8948

Matchless.

MATCHLESS Motor Cycles; no quicker delivery obtainable than from Colmore Depots. [0881

1915 Matchless Combination, electric lighting, new condition; £72.—Ross, 86, High Rd., Lee, S.E. [1369

MATCHLESS Combination, 1916 Model 8B2, 7h.p. M.A.G., 3-speed gear, detachable wheels, spare wheel, new type sprung sidecar with spring wheel, latest type spring fork, Lucas electric dynamo lighting set, in perfect order; £90.—Box L3,476, c/o *The Motor Cycle*. [1426

New Hudson.

1915 T.T. New Hudson, 2¼h.p., 2-stroke, just overhauled; a bargain, £16.—Lieut. Moulds, Fairseat, Deepcut, Hants. [1392

NEW Hudsons are actually in stock at Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green. Deferred terms, exchanges. [1500

NEW Hudson 6h.p. Coachbuilt Combination, late 1914, been thoroughly overhauled, 3 speeds, K.S.; £42/10.—Please call, 76, Summerley St., Earlsfield, S.W.18. [1359

NEW Hudson Coachbuilt Combination, 3½-4h.p. J.A.P engine, 3 speeds, clutch, and kick starter, good condition; £22.—P. J. Evans, John Bright St., Birmingham. [1581

MOTOR CYCLES FOR SALE.

New Hudson.

NEW Hudson, 1914, 3½-4h.p., 3-speed, coachbuilt sidecar, Stewart horn, 3 lamps, spares; £45; trial by appointment.—M. Watt, 15, Lancaster Park, Richmond, Surrey. [1360

New Imperial.

NEW Imperial, 1917, 2½h.p., 3½h.p., 6h.p. models in stock.—Crow Bros., Guildford. [9212

NEW Imperial, 2-speed, 2¾h.p. J.A.P., 1916.—25, Esme Rd., Sparkhill, Birmingham. [X8769

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Imperial-Jap's, delivery from stock. [9576

COLMORE Depots, Manchester and Leicester, for immediate delivery of New Imperial motor cycles. [0805

NEW Imperial-Jap, 1916, 2-speed; 23 gns.; write appointment.—L.-cpl. Smith, 32, Oxberry Av., Fulham. [1419

RUNS on Paraffin.—1915 (late) New Imperial, 2-speed; 24 gns.—Troward's, 78, High St., Hampstead. [1483

NEW Imperial-Jap; immediate delivery all models.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0839

NEW Imperial Lightweights, 1917 2-speed models from stock; 39 gns.; best value on the market.—Motories, 68, Horton St., Halifax. [1460

NEW Imperial 1917 Models for immediate delivery; model 1, 39 gns., No. 2 46 gns.; several second-hand 1916 machines from £30.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0886

1917 New Imperial-Jap, 2¾h.p., clutch, kick starter, countershaft, lamp, run about 300 miles, perfect order, petrol for about 700 miles; 35 gns.—R. Howell, 18, Grosvenor Gardens. Call between 10 a.m. and noon. [1530

NEW Imperial-Jap, 2-speed gear, capital condition, 19 gns.; very great snip; cheapest New Imperial in England.—Julians, 84, Broad St., Reading. Biggest light car and motor cycle dealers in the South. 'Phone: 1024. [0902

NEW Imperial 1917 Models in stock; light tourist, 2 speeds, countershaft, 39 gns.; clutch and kick starter models, also ladies' models ready to drive away.—P. J. Evans, Controlling District Agent, John Bright St., Birmingham. [1579

IMPERIAL-J.A.P., 4½h.p., single-cyl., 3 speeds, with comfortable sidecar, in perfect condition, not used since been thoroughly overhauled, with extra cover and tube, ready for road; price £50, or near offer; seen by appointment.—H., 33, Cottenham Park Rd., Wimbledon. [1440

Norton.

NORTON 1915 T.T. Model, fast machine, mechanically sound, as new; £47/10; guaranteed.—Wauchope's, 9, Shoe Lane, London. [1564

NORTON Big Four 1916 De Luxe Combination, 3-speed countershaft, all-chain drive, 3,000 miles, as new, original tyres; 70 gns.; good reason for selling.—Holmes, Hawthorns, Belmont Rd., Hereford. [X8802

O.K.

O.K. Junior, 1917 models in stock, immediate delivery, M.A.G. and J.A.P. engines, 2-speed, kick start models; demonstrations arranged; weight 130 lbs., 130 m.p.g., and 45 m.p.h.; from 38 gns.—Meeten, O.K. Specialist, Dorking. [1395

Overseas.

1916 Overseas, 3½h.p., with £16 sidecar, kick starter, clutch, 3-speed countershaft (splendid condition); sacrifice £56.—Greenough, 71, Wells Rd., Bristol. [1361

P. and M.

P. and M., 3½h.p., 1914, complete, capital order.—Maclean, Dalry, Ayrshire. [1429

P. and M. Motor Cycles, 1913, 1912; £23, £32; bargains.—H. V. Locke, Draper, Penge. [1493

RUNS on Paraffin. 1914 P. and M., 2-speed, run 5,000 miles, excellent order; 36 gns.; with new coach sidecar 42 gns.—Troward's, 78, High St., Hampstead. [1484

£26.—2-speed late 1910 P. and M., perfect condition, coachbuilt sidecar, accessories, petrol, carbide; seen any time Searchlight Station, Shepherd's Lane, Dartford, or by appointment London. [1448

Precision.

3¾h.p. Precision, Bosch, B. and B., variable jet, speedometer, P. and H. lamps, excellent condition.—Rogers, 142, Handcroft Rd., West Croydon. [X8804

FINE Bargain.—1914 Precision, 3½h.p., T.T. bars, variable B.B., Triumph clutch wheel, lamps, mechanical horn; £18/10.—Roberts, Oak Villas, Mancott, Hawarden, near Chester. [X8885

RUN on Neat Paraffin.—1914 Victoria-Precision, 4 h.p., clutch, 22 gns.; 1914 Regina-Precision, 4h.p., 3-speed, 24 gns.; 1914 Torpedo-Precision, 4h.p., clutch, 22 gns.; 1914 Pilot-Precision, 4h.p., 3-speed, 24 gns.; 1914 Rolfe-Precision, 8h.p., 3-speed countershaft, clutch, kick start, all chain drive, coach sidecar, hood, screen, 41 gns.—Troward's, 78, High St., Hampstead. [1476

Premier.

1915 2½h.p. Premier, has been little and carefully used; £20.—Pearce, Woodmancote, Cirencester. [1385

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MOTOR CYCLES FOR SALE.

Premier.

PREMIER, 1912, 3½h.p., 2 speeds, £19/10; or with sidecar £22/10.—Motor Exchange, Horton St., Halifax. [1461

1914 3½h.p. Premier, 2 speeds, coachbuilt sidecar; £45; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0823

PREMIER, 3½h.p., 1912, excellent condition throughout; 15 gns.—Lionel Kington, 245, Hammersmith Rd., London, W. [1381

1913 Premier, 2-speed, countershaft, grey Cancelet sidecar, all accessories, splendid condition; £30.—17, Arcadian Gardens, Bowes Park, London, N.22. [1492

£32.—1914 Premier, T.T., paraffin vaporiser, auxiliary tank, 140 m.p.g., 68 m.p.h.; new tyre, tube, belt, Lucas lamp.—P.D., 58, Woodfield Rd., Ealing, W.5. [1378

PREMIER Lightweight, 2½h.p., 1913, in good going order, just overhauled; owner medically advised to give up riding, only reason for selling; no offers; first cheque £11 buys.—Evans, 4, Bridge St., Hitchin. No offers. [1529

Quadrant.

QUADRANT, 4h.p., Roc 2-speed, handle starter, B. and B., mag., and sidecar, wants enamelling; £8 lot, bargain.—29, St. Leonard's St., Bow. [1367

Radco

RADCO, 1915, 2-stroke, complete, as new; £17.—Pyle Bros., Buxton. [1225

RUNS on Paraffin.—Late 1915 Radco, 2-stroke; 17 gns.—Troward's, 78, High St., Hampstead. [1485

RADCO, in perfect order, just been thoroughly overhauled, new back tyre, extra new belt; 15 gns.—F. Facer, Quorn, Loughborough. [X8813

Rex

REX, 1913, 6h.p., sidecar, F.R.S. lamps, wind screen, completely equipped; £32.—Noyes, 4, Collingbourne Rd., Shepherd's Bush. [1402

REX, latest model, 2 speeds, coach combination, £49/10; 1913 Rex Sidette, well equipped, £39/10.—Motor Exchange, Horton St., Halifax. [1462

Rover.

COLMORE Depots, Birmingham and Manchester, for quickest delivery of Rover motor cycles. [0883

ROVER Combination, 1917 model, new, for immediate delivery; £89/9.—Colmore Depot, 211, Deansgate, Manchester. [0887

BIRMINGHAM Agent for Rovers, P. J. Evans, John Bright St.—1917 models in stock for immediate delivery.—See below.

1917 3½h.p. Rover Coachbuilt Combination, 3-speed countershaft gear, De Luxe sidecar; 90 gns.—Below.

1917 3½h.p. Rover, sporting model, racing or semi racing handle-bars; £57/10; extra for hand-controlled Philipson pulley, £4/10.—P. J. Evans, John Bright St., Birmingham. [1578

ROVER, 1915, 3½h.p., 3-speed countershaft, speedometer, lamp, tools, horn, guaranteed perfect order; £42.—Clay, Architect, Gravesend. [1406

ROVER, 1915, 3½h.p., 3-speed countershaft, ridden solo since new, original Dunlops; bargain, £43.—Mannings, Jeweller, East Grinstead. [1398

1913 3½h.p. 3-speed Rover, Bosch mag., B. and B. carburetter, new Dunlop back tyre, lamps, and horn, in perfect condition; £32.—The Premier Motor Co., Aston Rd., Birmingham. [1537

1916 3½h.p. 3-speed Countershaft Rover, absolutely like new, all in splendid order and condition guaranteed; £51; extended payments arranged.—Jones, Garage, Broadway, Muswell Hill. [9891

Royal Ruby.

1915 Royal Ruby 2-stroke; £17/10.—Motor Exchange, Horton St., Halifax. [1463

ROYAL Rubys.—Get them at Lamb's; they're actually in stock; exchanges, deferred payments.—151, High St., Walthamstow, and 50, High Rd., Wood Green, N.22. [1497

Rudge.

RUDGE Multi, 1915, 3½h.p., Millford sidecar, lamps, horn, spares, etc., in excellent condition; must sell; offers.—Bragg, 154, Grosvenor Rd., S.W.1. [1555

1915½ Rudge Multi, 3½h.p., hand clutch, almost new, very smart and good machine; 37 gns.—Lionel Kington, 245, Hammersmith Rd., London, W. [1382

RUDGE, 1911-12, 3½h.p., fitted Grado Multi gear, just overhauled, good condition, bargain, £26; also wicker body sidecar, less clips for cycle, £2. Moody, Surveyor, Boston, Lincs. [X8959

RUDGE, 1913, 3½h.p., F.E., Mabon variable gear, and cane sidecar, just fitted with new cylinder, piston, and steel-studded rear tyres at cost of £10, in good running order; £25.—W. King, 52, Plantation Rd., Leighton Buzzard, Beds. [1523

RUDGE 5-6h.p. Multi and Bramble coachbuilt sidecar, Jones trip speedometer, Lucas horn, combination new November, 1916; cost £88, done 750 miles only; take £65; perfect condition.—Roth, Queen's Head Hotel, Queen's Rd., Brighton. [1397

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South Africa—Central News Agency, Ltd. Paris—Smith's English Library, 248 Rue Rivoli.

Cooling the Engine Interior.

AN article which should create more than ordinary interest is one on the subject of the internal cooling of engines which appears in this issue. The writer uses as his text the beneficial effects which have been obtained in aero engines by studying the methods of maintaining the main portions of an engine—and particularly the oil—at a low temperature. Examples are given and a design suggested suitable for adoption on a motor cycle engine. Though the writer confines his attention mainly to the provision of a means of creating a cooling draught on the interior of the piston, which, sandwiched as it is between the cylinder walls, is *the* hot spot of any engine, the question of the materials used in an engine is wrapped up in the same problem. By this we mean that metals having the greatest heat conducting powers would assist in obtaining the same end. For instance, if, as we are inclined to think, motor cycle engines of the future follow aero engine practice and are fitted with aluminium cylinders having cast iron or steel liners in conjunction with aluminium pistons, it may be possible to obtain the coolest possible type of engine. Hitherto the tendency has been to confine attention to the external methods of cooling an engine, and insufficient thought has been paid to cooling an engine internally.

The lubricating systems of motor cycle engines are not, unfortunately, of the most efficient kind, and, consequently, it is of dire necessity to ensure best possible working conditions for the piston, or partial seizures occur. That this question of internal cooling is no myth can be proved by any rider who takes the trouble to place his hand on the crank case of an engine after prolonged running; the heat from conductivity and imprisoned air in the crank case is quite considerable, and would be sufficient greatly to thin the oil even if the lubricant were not constantly in contact with the almost red hot piston. A cool engine is usually economical in oil consumption. It will maintain its power much longer than any hot-running engine, for it is less punishing to the valves, valve springs, piston rings, and plugs. Surely, then, if the water-cooled engine needs a system of oil cooling and internal cooling generally, it is doubly desirable in the case of an air-cooled motor cycle engine.

The Selection of a Sidecar Attachment.

IF the average motor cyclist be asked what his sidecar attachment weighs, the answer will probably be a confession of ignorance, or perchance a guess many pounds wrong. That statement represents the amount of consideration the ordinary buyer gives the subject of weight in his search for a really comfortable and reliable attachment. Frequently one encounters heavy and most luxurious coachbuilt sidecar bodies mounted on the strongest chassis, replete with hood, screen, and sometimes a luggage grid and spare petrol tin as well, being tugged along by medium-powered machines, but it is asking too much, and robs motor cycling of half its pleasures. No doubt the error is in the majority of cases due to the sidecar attachment being purchased separately, for not many manufacturers produce complete 3½ h.p. sidecar outfits, and those who do are careful to ensure that the power unit is not overloaded.

The natural tendency is for a buyer to study comfort, appearance, and design only—frequently no doubt the would-be occupant of the sidecar has a say in the matter—and the all-important question of weight is too frequently ignored. As a result, the turn out proves satisfactory to a degree, but is slow on hills, consumes more petrol and oil than it need, and the excessively heavy sidecar imposes an undue strain upon the engine, transmission, frame, and tyres, most of which could have been avoided with forethought.

An index to the advertisements in this issue will be found on the page facing the back cover.

Occasional Comments by "Ixion"

A Ludicrous Derangement.

HERE is a little mechanical puzzle for readers to solve—perhaps the quaintest which has ever been referred to me during my long association with this paper. A B.S.A. owner complains that his machine goes better uphill than on the level! On the level at speeds of 25 m.p.h. and upwards the machine runs perfectly for forty yards or so, then "the strokes seem to be smothered, the bicycle slows somewhat, and returns to normal after twenty yards or so." In another forty yards the symptoms may recur, but never uphill. The machine can still do its 45 m.p.h. and all the usual tests; substitutions and adjustments have been tried. We are all familiar with machines that run nicely on the flat but curl up more or less uphill; the reverse is unusual.

Water Cooling.

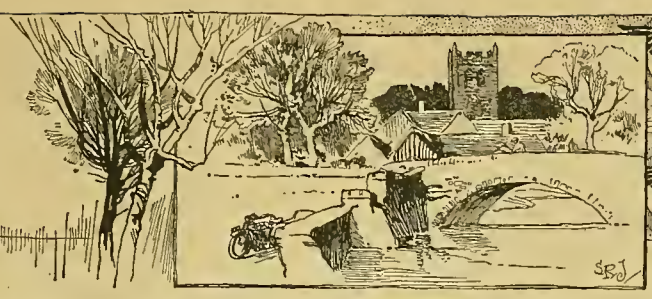
THIS hardy annual crops up at regular intervals, and I am afraid I never offer it a very hearty welcome. For one thing, I am not a sidecar man, and in solo work I never need better cooling than air supplies, provided I have got hold of a decent sparking plug. No man in the kingdom tests engines harder than I do from a cooling standpoint, unless it be the low-powered sidecar enthusiast whose wife is stout: for I habitually visit the hilliest parts of the country, and I always take hills as fast as possible, restrained only by the capacity of my engine and the acuteness of the corners. So I have no inducement to clamour for enhanced cooling, if it implies greater weight. Moreover, I do not grow any younger, and I am not as ready as once I was to lug about a great deal of unnecessary weight. If I had to choose between two machines of equal pleasantness, one of which scaled 250 lb. and the other 200 lb., I should plump for the 200-pounder every time; and if another maker came along with a machine as fast, as comfortable, and as refined at 150 lb., I would sell the best 200 lb. mount in the world that very day. Of course, if some water-cooled enthusiast will give us a 2 h.p. machine which can do the work of our best air-cooled 3½ h.p. types, it would be another pair of shoes altogether; and I suppose it is thinkable that the ultimate machine may take the guise of a water-cooled bantam-weight, though I doubt it. For the moment, I do not think anybody is very seriously interested in water cooling, except those patient souls who drag their wives, babies, and a week's luggage about the country in 3½ h.p. sidecars: and their desire for improved cooling must have our respectful sympathy, even if it need not affect the industry as a whole.

There is one more corner of the industry in which water cooling may become part of practical politics—I mean the two-stroke. I am rather surprised that nobody has evolved a water-cooled baby two-stroke. I should not be surprised if it is possible to design a machine fitted with a water-cooled 2 h.p. two-stroke engine, Green type radiators, spring frame, and three-speed gear, which might prove to be as sound a solo mount for hard work at moderate speeds as the world could offer. A well run-in baby two-stroke is always a glutton for work, but the cooling margin is slender, even with a crack machine in skilled hands. Given a port design which combined two-stroking down to really low speeds with good power at high speeds, and the extension of the cooling margin which a water-jacket might confer, such a machine might prove to be very charming in use and very remunerative to its producer. In other words, it would be a light and simplified Scott. Promises of 30% more power from a 3½ h.p. engine leave me stone cold, if they connote more weight; I have arrived at the state when I am inclined to desert the 3½ h.p. for the 2¾ h.p., because it gives me almost as much power, speed, and comfort at a lower weight. If I want 30% more power than an air-cooled 3½ h.p. can afford, and a maker offers it to me in the form of a water-cooled 3½h.p., I should take the same power at the same weight in the form of a 5 h.p. air-cooled twin.

Graphite-laden Bearings.

SOME nameless correspondent has sent me an advertisement folder of the patent for impregnating bearings permanently with graphite, to which I alluded recently. The makers do not yet appear to dispense with oil altogether, even for bearings unlimited in size and carrying limited stresses; for they recommend the retention of 10% of the usual oil supply even with the huge and comparatively lightly stressed bearings employed for shafting in factories. Still, the invention may point to coming developments in petrol engines, and a description may interest readers. Minute cones of pure graphite have their bases embedded by a special process in a flexible fabric woven of fine copper wire; the patentees describe it as a "wire screen." When a pair of white metal bearings are to be cast, the mandrel is faced with this patent graphite sheeting, before being placed in position in the box; and the white metal is thus cast around the graphite cones, the tips of which protrude through the white metal, and form part of the working face of the bearing, the wire screen being well down in the white metal, and out of contact with the shaft, when fitted up. The working faces of the bearing are then scraped or turned in the usual fashion. The exact point of development appears to be that these graphite-impregnated bushes are already applicable to bearings which can be made of large area in proportion to their load, conditions which do not apply in any internal combustion engine; and that, when graphite is so used, the oil supply can be cut down from 75% to 90%. But there is a long furrow to hoe before we shall buy motor cycle engines ready fitted with an internal lubricant lasting 10,000 miles.

INTERNAL COOLING.



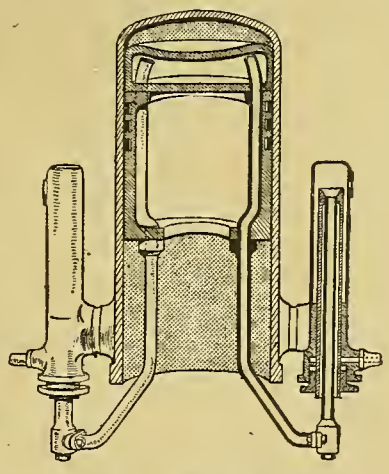
A Suggestion for More Perfect Cooling based on Aero Engine Practice.

IT is estimated that the h.p. per unit of capacity of certain air-cooled aeroplane engines is approximately half that of the best water-cooled engines. This may apply in such engines as the Gnôme, where many things have to be taken into account in addition to h.p. per unit capacity, but it is, of course, a very unfavourable estimate when taken as a general comparison. The writer would imagine that the ordinary motor cycle engine loses not more than 20% of its power output through its somewhat crude system of cooling, and even then the loss does not generally occur unless the engine be persistently overloaded, as in the case of a 3½ h.p. machine with heavy sidecar attached. Still, the fact remains that if the efficiency of cooling could be improved in motor cycle engines they would prove very much more satisfactory.

The matter of weight is another important question involved. A properly cooled engine would do its work at a smaller throttle opening than one working on the hot side; also, it would require very much less oil. Valves would last better, would require less attention, would not be so liable to break, and therefore might be of lighter construction. Piston rings also would give no trouble, and carbon deposit would not occur so rapidly. In other words, higher all-round efficiency might be obtained, and the weight of the unit, therefore, reduced.

Better Cylinder Cooling.

We have only to follow the development of the aero engine in order to realise what vast strides have been made in the casting of air-cooled cylinders since 1914, especially as regards their heat dissipating qualities. Then, again, the steel cylinder of light section opens up promising fields, though its high cost of manufacture may render its use impracticable except in the case of the more costly machines. It may be taken, however, that the post-war cylinder will be something very near perfection as regards cool running, but, even though it be perfection itself, the question of overheating will be solved only so far as the cylinder is concerned. There is another member just as liable to overheat and just as liable to cause loss of power and extravagant fuel consumption if it *does* overheat, namely, the piston.



A method of cooling the piston of a stationary engine. The piston head is hollow, and through it oil is forced, the reciprocating motion of the piston operating the tubular pumps.

Overheated Pistons.

Many of us have possessed engines with which the most elaborate auxiliary radiating fins and heat dissipators have failed to cure overheating. Why? Taking it that the timing and other adjustments are correct, there can be but one reason, namely, that it is not at the cylinder where the trouble starts, but at the piston. The piston overheats first, causing faulty running, which may, almost immediately, cause the cylinder also to overheat. In many early aeroplane engines, indeed, the centres of the pistons became almost or quite red hot, causing pre-ignition, though the cylinders remained reasonably cool.

Such a state of affairs is by no means surprising if we pause to consider the position of this very energetic member—the piston. It is working in a more or less insulated position, exposed to considerable heat, yet having only the most uncertain ways of ridding itself of that heat. The ways are (1) by conduction to the cylinder, (2) by "cool" oil thrown upon it, and (3) by the incoming cool charges.

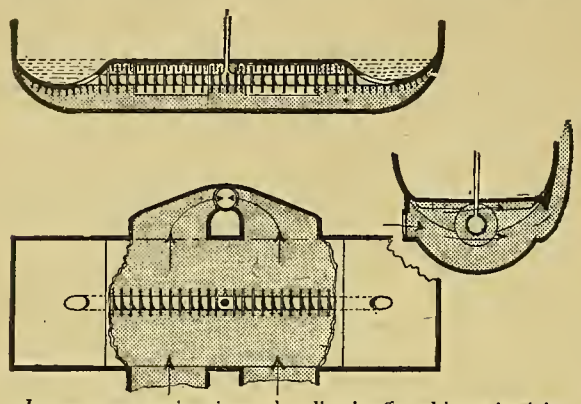
(Be it noted that the last two conditions tend equally to cool the cylinder, but the cylinder also has the outside current of air playing upon it.)

Obviously Insufficient.

Dealing with condition (1), conduction to the cylinder, there are several things which prevent the heat passing readily from the piston to the cylinder. Firstly the metallic contact between the two is uncertain, the piston being a slack fit. The only certain metallic contact (as regards heat conduction) is between the piston *rings* and the cylinder, and if all the heat accumulated by the piston has to pass away from it *via* the rings, then one no longer wonders that piston rings are so very apt to become burnt and carbonised into their grooves. In other words, if the piston were independently cooled, the rings would show nothing like the same tendency to become carbonised. Then again, the piston is surrounded by a good film of oil, which does not conduct heat readily, and lastly the cylinder has quite enough to do to keep itself cool, without lending a hand to the piston.

Internal Cooling.—

CONDITION 2. Cool oil splashing up on the inside of the piston is certainly a very doubtful proposition. Firstly there is not enough of it really to cool the piston, and secondly, the inside of the piston is usually coated with sufficient carbon to act as an insulator.



In many aero engines internal cooling is effected by maintaining the oil at a low temperature. By the general principle here illustrated the crank case is provided with a false floor, and between this false floor and the bottom of the crank case proper the air feed to the carburetter is drawn. The suction oil pipe from the sumps passes through this air-swept recess, and is provided with radiating fins, as also is the floor of the crank case. By this system the heat absorbed from the oil is utilised to assist carburation.

CONDITION 3. The cool unburnt charge undoubtedly tends to cool the piston, but not to the same extent as it does to cool the cylinder, as in accordance with the writer's views, the exploded charge remains in contact with the piston longer than it remains in contact with the top of the cylinder.

Cooler Pistons Necessary for Perfection.

All this goes to show, then, that the piston is more likely to retain its heat and thus cause overheating than is the cylinder. The cylinder gets the full cooling benefit of the incoming charges, also it is exposed to the open air. It is cooled inside and out, and the piston also should be cooled inside and out. It goes to show further that, even though cylinder cooling may become perfect, we must not consider the question settled until some provision is made for dissipating the heat from the piston.

Aero Engine Practice.

Reverting to aero engine practice, it is to-day fully realised that there is much to be gained by cooling the power unit internally. The design of the Maybach engine used on the Zeppelins is such that a cold current of air is passing continuously through the crank case. The current is created by the passage of the machine through the air, air being drawn through the crank case by means of a funnel-shaped cowl, facing backward, and around the mouth of which the backward rush of air tends to create a vacuum. Cold air is drawn in at the other side of the crank case, and thus the whole interior of the engine is kept at a low temperature, the strength of the draught increasing with the load, and in this way loss of lubrication by evaporation is eliminated, while the lubricating properties of the oil are retained.

There are several other systems of internal cooling in vogue in modern aero engine practice—the diagrammatic sketches being self-explanatory. In the example shown the crank case is provided with a false floor—a hollow space under the crank chamber proper. Through this space the supply of air to the carburetter is drawn, so that this considerable draught is directly in contact with the bottom of the oil sumps. In addition, the main oil circulating pipe runs through the bottom space, both the pipe and the bottom of the sumps being provided with radiators.

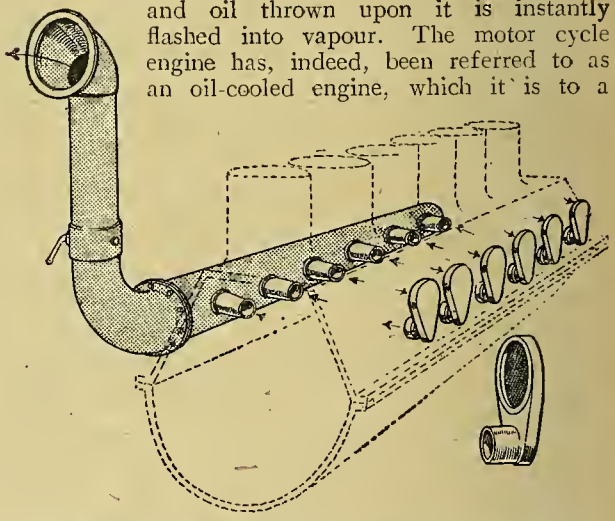
In other cases special outside radiators are employed for the oil, while in one or two special cases the charge is drawn through the crank case and fed to the cylinder *via* valves in the centre of the pistons—the ideal system on paper.

The Trend of Invention.

It will be seen, then, that the general trend of design is towards a forced draught for internal cooling, and naturally the air supply to the carburetter presents the most obvious means. This system has two additional advantages—it feeds hot air to the carburetter, and the cooling draught increases in strength with the speed of the engine. Yet there are reasons why this system may never be adopted in motor cycle engine design.

A Two-stroke Comparison.

Air-cooled motor cycle engines are characteristically heavy on oil, chiefly on account of the heat of the piston. After a few explosions the piston becomes so hot that it acts simply as an evaporating plate, and oil thrown upon it is instantly flashed into vapour. The motor cycle engine has, indeed, been referred to as an oil-cooled engine, which it is to a certain extent, and therefore provision should obviously be made for cooling the oil.

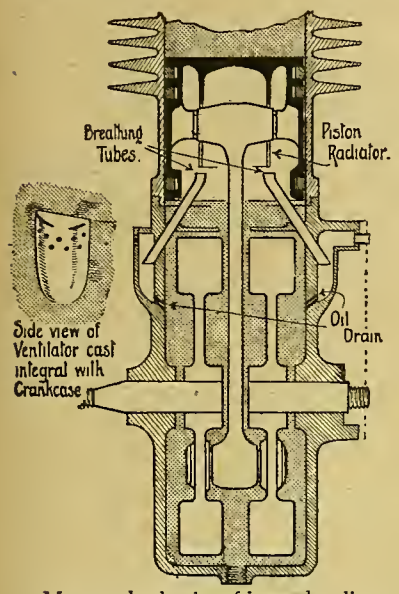


The method of internal cooling applied to the Maybach (Zeppelin) engine. The cowl faces in the opposite direction from that in which the airship is travelling, and the vacuum created about the mouth of the cowl draws cold air through the crank case. On the opposite side of the crank case are a series of gauze-protected breathers, so arranged that the draught from them plays directly on the big end bearings. Zeppelin engines are provided also with elaborate oil coolers.

As a practical illustration let me quote my own experience. Recently, I have ridden to and from business, ten miles daily, in two and a half mile

Internal Cooling.—

runs, a two-stroke machine having sump lubrication, and I have made the very startling discovery that one tablespoonful of oil per hundred miles was ample, though on long journeys this same engine requires quite a normal quantity of lubrication.



Motor cycle adoption of internal cooling would necessitate absolute simplicity. An induced draught would involve complications, but a great deal of heat might be dissipated from the piston by assuring a feed of cool air under it instead of imprisoning hot air.

The explanation is simple. A two-stroke engine benefits by internal cooling, and on these short journeys the cool draught passing through the crank case is sufficient to keep the whole interior of the engine at a low temperature, so that no evaporation of the lubricating oil takes place. A four-stroke engine, on the other hand, quickly heats up internally owing to the imprisoned or partially imprisoned air in the crank case, and oil evaporation takes place even though its use be confined to the shortest of journeys.

I am aware that many riders will at once state that two-stroke engines are notoriously heavy on oil, but this is because most of the lubricant is blown into the cylinder head and out of the exhaust port—not through evaporation. I believe that if wastage of solid oil were eliminated, the two-stroke would prove surprisingly economical in oil, owing to its internal cooling.

A Suggested Method.

Internal cooling, then, is desirable—firstly from the point of economy, secondly from the point of efficiency. We have to aim at cooling the piston, as thereby we prevent the oil from overheating.

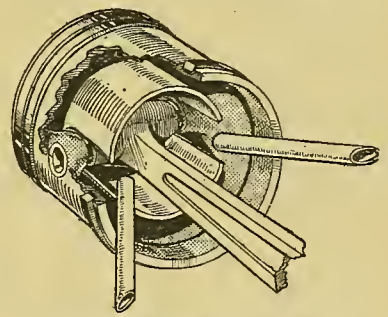
The matter of internal cooling as regards motor cycle engines may present certain difficulties that are not present in the case of the aeroplane engine, but still the matter is far from being impracticable. The atmosphere surrounding a motor cycle is normally one of dust, which must be excluded. We do not want any fitment which will be noisy in operation, and our space is limited. Still, I am of the opinion that something in the way of a "piston cooler" and internal ventilator might be arrived at, and I would suggest the following simple expedient—not as a solution to the problem, but as illustrating the bedrock principle on which something better might be built.

The illustration is perhaps self-explanatory. Take as an example a single-cylinder four-stroke engine.

At either side of the crank case, and part of the casting thereof, are simple ventilators so designed that they will not collect an undue amount of dust, while oil cannot escape from them. From these ventilators or breathers, which are merely pockets at the sides of the crank case casting, and have no communication with the interior of the crank case other than a small hole at their base to drain away oil, there extend pipe connections which convey air directly under the piston and on either side of it. By this means the piston would be in contact with constantly changing blasts of cold air, instead of being in contact with imprisoned hot air, and this, in the writer's opinion, would be sufficient to keep the piston at a reasonable temperature. An aluminium piston of special design (illustrated) provided with a circular radiating fin, as shown in the sketch, and scientifically planned, used in conjunction with this or a similar cooling system, would perhaps solve the problem.

Objections to the System.

There are objections to this system. The engineer at once thinks of grit, but I see no reason why such impurities need be taken into account any more than with a two-stroke, or than in the case of a hollow crankshaft compression release. There would be no appreciable friction if the air release were of sufficient size, this point having already been proved in public trial. What we are aiming at is to overcome the present objection of imprisoned hot air in direct contact with the piston, which enables the piston to overheat.



Normally aluminium pistons are provided with internal fins for conducting the heat from the centre of the piston to the rings. This system spells comparatively short life for the rings and the accumulation of carbon deposit about the grooves. The piston here illustrated is provided with a central circular radiator, the object of which is to absorb and dissipate a large proportion of the heat ere it reaches the rings, the radiator being cooled by the blast from the breathing tubes.

Release this imprisonment, make sure of cool air under the piston, equip the piston with thin light radiating fins as shown in the illustrations, and, in the writer's opinion, we are on the high road to the evolution of the really air-cooled engine.

The chief objects and conclusions of the foregoing are, therefore, as follow:

1. A cool piston would tend towards economy, higher efficiency, and longer life of the engine.

2. It is concluded that piston designs, wherein it is aimed at conducting all heat from the centre of the piston to the rings, are inefficient and wrong. The piston rings should not be utilised to answer the dual purpose of rings and heat conductors. In the design suggested a large proportion of the heat from the centre of the piston is intercepted and absorbed ere it gains the rings, and the piston has no excessively hot spot to act as an oil evaporating plate.

CHINOOK.

A Combination of Trailer and Sidecar.

IN the States a curious little trailer, known as a "Rear-car," seems to have "caught on." As a passenger vehicle it is gaining favour, but where the Cygnet—a vehicle of the "rear-car" type—has created most attention is in its adaptability for business uses. It is used extensively by big concerns as a parcels carrier, taking the place of a motor car, and photographs have appeared in *The Motor Cycle* of the rear-car in that capacity. The present photographs show this unconventional combination used as a pleasure type motor cycle, and one's first impulse is, of course, to compare it with the popular sidecar, and, just as criticism was levelled at the Scott Sociable because of its unconventionality, so it will be in the case of the rear-car.

An advantage it possesses over the sidecar is its superior seating accommodation; but then it has a correspondingly great and obvious disadvantage in its four wheels and three tracks. Thus in England a car licence and large numbers would be necessary. The photographs show a fleet of Cygnet cars coupled to leading makes of motor cycles, and occupied by agents and their families and friends about to start on a demonstration trip.

As the string of cars moved through the cities and towns, and out on the open highway, they attracted endless attention, and whenever stops were made, crowds gathered quickly. The day's travel exceeded 200 miles, embracing the following communities: Pasadena, Monrovia, Azusa, Claremont, Upland, San Bernardino, Colton, Riverside, Ontario Pomona, San Dimas, and Covina.

A cavalcade of Cygnet rear-cars ranged in front of one of the chief buildings in Los Angeles, California. They are coupled to high-powered motor cycles, among them being the Indian Henderson, Harley-Davidson, Thor, and Excelsior

Volunteer Motor Cyclists' Team Trial.

All Day Military Scheme arranged by the Liverpool National Motor Volunteers.

FORTY officers and men of the Liverpool National Motor Volunteers (Motor Cycle Section) paraded for the purpose of this test on the 7th inst. They were divided into teams of four, comprising solo machines under 3½ h.p., solo machines over 3½ h.p., sidecars under 5 h.p., and sidecars over 5 h.p.—one of each forming a team. Prizes were awarded to the winning team, whilst in addition there were several special individual prizes given by various friends of the section.

The course, which started at the Old Roan Hotel, Aintree, was *viâ* Ormskirk, Preston, and Longridge to Whitewell, a distance of forty-three miles. The afternoon course was from Whitewell *viâ* Trough of Bowland (with its stiff hill and bad road surface) to a watersplash over the River Wyre, then to Lancaster and Garstang, where the test finished.

Some forty-odd officers, N.C.O.'s, and men paraded, only two machines failing to keep the average of 20 m.p.h. over the morning's course, which was over very narrow winding roads. The scheme was carried out without accident with two exceptions. Pte. Bore, for some reason, failed to take a sharp turn after crossing a small bridge and made straight for a hedge, first, however, running up a bank of waste earth, which caused his machine to rise and jump clean over the hedge into a field, terminating in a drop of about 12ft. Fortunately, he was not hurt, only shaken up, but his Brough machine was wrecked. At the same corner also Q.M.S. Holloway, who was mounted on a 6 h.p. Enfield, without passenger, failed to take the corner, his machine turning upside down. In this instance neither machine nor rider was damaged. Results:

WINNERS.—No. 2 team, comprising Sgt. Hopton (3 Enfield), J. Brindle (3½ Triumph), T. James (3½ Rover sc.), J. W. Livesy (8 Sunbeam sc.)

INDIVIDUAL AWARDS.—J. W. Livesy (8 Sunbeam sc.), best performance throughout.

BEST SOLO PERFORMANCE.—Pte T. W. Webster (3½ Sunbeam)

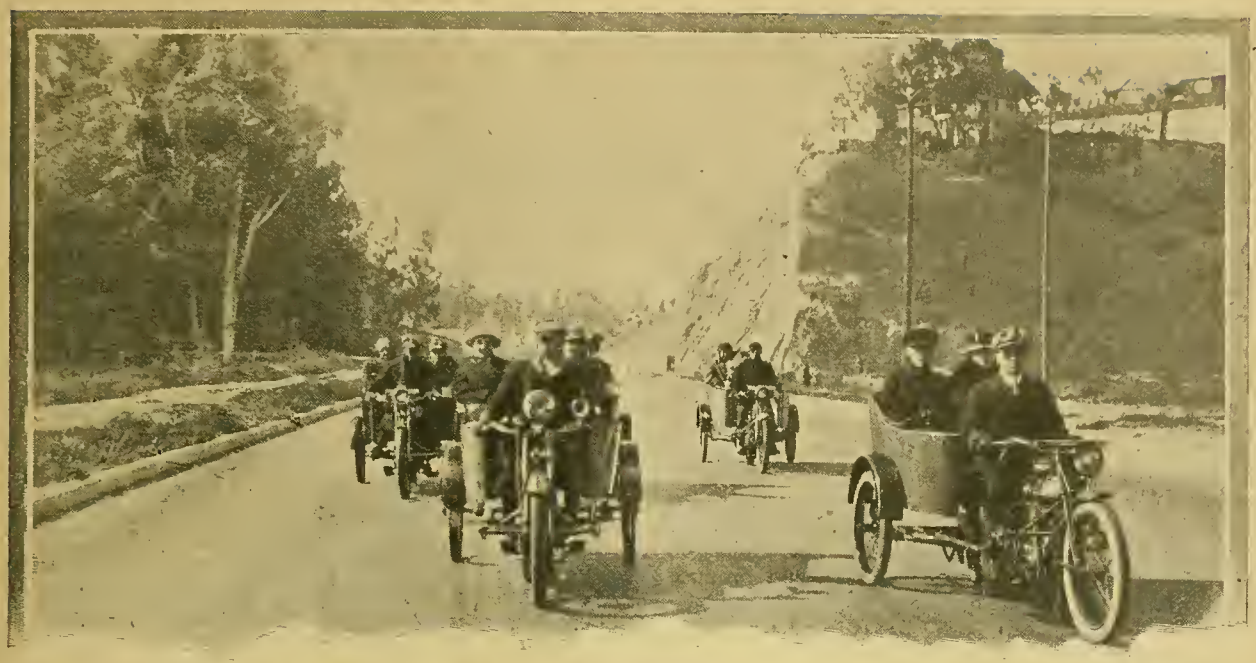
BEST LIGHTWEIGHT PERFORMANCE.—Sgt. Hopton (3 Enfield). This rider repaired a broken chain in the most difficult section without loss of time marks.

BEST 3½ H.P. SIDECAR PERFORMANCE.—W. P. Brindle (3½ B.S.A.)

BEST PERFORMANCE ON A.J.S. SIDECAR.—Sgt. Ellis

BEST PETROL CONSUMPTION.—Sgt. Hopton (3 Enfield) and H. T. Williams (2¾ Douglas) tied.

The awards were announced and prizes distributed after tea at the finish at Garstang. At the conclusion, Mr. Phillpott briefly indicated that Mr. Zaccharius (one of the officers of the section) was joining H.M. Forces during the week, and on behalf of all the section expressed regret at his leaving, and at the same time paid a tribute to the splendid manner in which he had kept the work of the section going. Sgt. Ellis and Pte. D C. Williams, representing the N.C.O.'s and privates, also spoke, and on behalf of the whole section presented Mr. Zaccharius with a very fine solid silver cruet set and cigarette case, and, in addition, an enlargement of his photograph is being handed to him.



A fleet of seven Cygnet rear-cars transporting twenty-six people at Los Angeles, California (see opposite page). Our correspondent says the vehicles attracted endless attention whenever a stop was made. Observe the reinforced concrete surface.

Traction Engine versus Motor Cycle.

The Result of an Action for Damages by a Sidecar Owner.

RECENTLY, a motor cycle agent of Selkirk was driving his 7 h.p. Indian combination when he noticed what appeared to be a light car coming towards him showing two lights a short distance apart. The owner drove well on his left of the road, and on reaching the vehicle discovered it was a traction engine with its two lamps hanging on the front axle a couple of feet apart, and leaving him no room to pass. He ran his sidecar up the bank, and was fortunate enough to clear the front wheel of the traction engine, but collided with the projecting rear wheels of the heavy vehicle. The motor cyclist brought an action for damages against the owners of the traction engine, alleging that the engine and two waggons "were being driven in a careless and negligent manner."

The defendants admitted that the engine was being driven in the middle of the road, and contended that as the surface of the road was towards its edges softer than in the centre they were justified in so driving. They claimed that it is the practice for motor cars meeting traction engines at night to stop and then pass slowly "by adjustment," and they further claimed that at night time the driver of the engine is entitled to stop another vehicle for the time required for drawing his unwieldy vehicle to its proper side.

The court would not admit this, and held that it was the duty of the driver to assume without delay such a position as would allow another vehicle to pass. They also held that the defendants were guilty of negligence by placing their lights only two feet apart on the front axle when the width of the engine was no less than 7ft. 10in.; but they considered the plaintiff was guilty of contributory negligence in having but one light shining forward on his sidecar combination (in spite of the fact that in Scotland there was no law compelling him to carry two lights).

It was at this stage that the owner of the motor cycle sought the advice of the Auto Cycle Union as to whether he should carry the case further. The Union strongly advised him to appeal to the Court of Sessions.

The motor cyclist accordingly decided to appeal, and the case was heard last month, when the Second Division reversed the judgment of the lower courts and awarded him £70 damages and costs.

This is the first case where the question of two forward lights on a motor cycle and sidecar has been brought before a High Court in the United Kingdom, whilst the ruling as to the proper lighting of a traction engine is most valuable to all road users. It must be borne in mind that in England sidecars are compelled to carry two forward lights under the Defence of the Realm Act.

THE NEED FOR PAPER ECONOMY.

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RETURNS ARE SOON TO BE STOPPED.

THE SPEEDS OF PARTS.

Interesting Figures and the Simple Calculations by which they can be reached.

HOW fast does a flywheel turn? There are probably not many motor cyclists who could answer this question. Certainly the writer and one or two other motor cyclists were not very near the mark when they were asked the peripheral speed of a motor cycle flywheel for a speed of 60 m.p.h. This and other interesting facts can, however, easily be determined by a few simple calculations.

Let us take the case of a standard 3½ h.p. motor cycle having a stroke of 88 mm., 26in. wheels, flywheels 7½in. in diameter, and a gear ratio of 4⅓ to 1. First, we will suppose the machine to be running on its stand at such an engine speed as would produce 60 m.p.h. on the road.

(1.) The peripheral speed of the flywheels will then be $\frac{60 \times 4\frac{1}{3} \times 7\frac{1}{2}}{26} = 75$ m.p.h.,

or $\frac{75 \times 22}{15} = 110$ft. per second.

(2.) The number of engine revolutions per minute will equal $\frac{60 \times 1760 \times 3 \times 12 \times 4\frac{1}{3}}{60 \times 3.1416 \times 26} = 3360$ approx.

(3.) The average piston speed can be ascertained as follows (304.8 being the number of millimetres in one foot):

$$\frac{88 \times 2 \times 3360}{304.8} = 1940\text{ft. per minute.}$$

or $\frac{1940}{60} = 32\frac{1}{3}$ft. per second.

(4.) The highest piston speed, which will occur at the moment when the crank is horizontal and be equal to the speed of the crank pin centre, may be shown to be (190.5 is the number of mm. in 7½in.)—

$$\frac{88 \times 110}{190.5} = 51\text{ft. per second (nearly),}$$

or $51 \times 60 = 3060$ft. per minute.

or $\frac{51 \times 15}{22} = 34.8$ m.p.h.

On the Road.

The foregoing figures are very simple; let us now imagine the machine on the road travelling at 60 m.p.h. Now, in addition to the various movements of the different parts, we have the progress of the machine as a whole, and though the few figures I propose to give are still quite simple and elementary, I have found that some motor cyclists have a difficulty in grasping the fact that, while the machine as a whole is moving in a forward direction, some individual parts may be, at the same moment, either stationary or moving in an opposite direction, viz., to the rear. This is something of a paradox perhaps, but it is still the truth.

135 Miles per Hour.

Let us take first the case of the wheels which act as perpetual levers between the machine and the ground. The point in contact with the ground is obviously standing still momentarily, therefore the top of the wheel must be moving forward at the rate of 120 m.p.h. Every point on the wheel which is level with the centre of the axle is travelling forward at 60 m.p.h., while the speed of those parts above the centre will lie between 60 and 120 m.p.h., and those below the centre between 0 and 60 m.p.h. In addition to this all parts in a vertical line with the centre are moving in a horizontal direction, those lying forward of this line are falling, and those behind it are rising. The movement of a point on a rolling wheel is therefore somewhat complex, being a compound of forward and up and down movements.

The flywheels have a movement somewhat similar to the road wheels, but they are not rolling. The speed of the top of the flywheels will be the sum of the peripheral speed and the forward motion of the whole machine

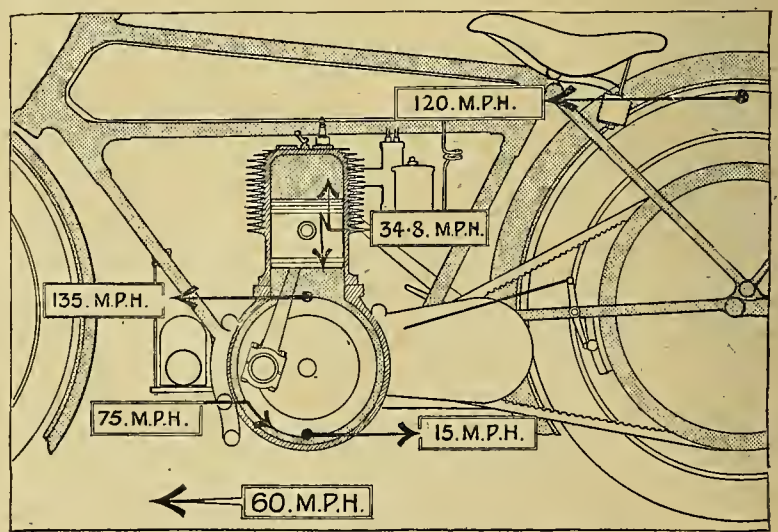
$$75 + 60 = 135 \text{ m.p.h.;}$$

and the speed of the bottom will be the difference of these two motions—

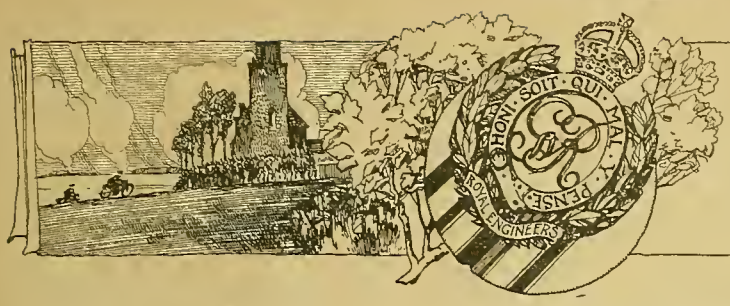
$$60 - 75 = -15 \text{ m.p.h.,}$$

which means 15 m.p.h. in a rearward direction. With this seeming anomaly, but really simple fact, I will close.

AURIGA.



Diagrammatical drawing indicating speeds of moving parts.



MILITARY NOTES.

THE LATE G. T. GRAY.

LAST week we chronicled the sad news of the death of Sec.-Lt. G. T. Gray, R.E., attached to the Royal Flying Corps. Gray's parents have now received a letter from his Commanding Officer giving some details which were not available last week. He was killed on Saturday, March 24th. Acting as observer, he was, with another officer, flying over the German lines taking photographs when they were attacked by a hostile plane. After a gallant fight for it, they were brought down over the British lines. They were buried together in a military cemetery.

THE VOLUNTEERS' BROWN BOOK.

IN an article, entitled "The Work of Volunteer Motor Cyclists," which appeared in the issue of March 15th, page 226, mention was made of the "National Motor Volunteer Handbook." This book, we may mention, can be obtained from the Headquarters, the National Motor Volunteers, Judges' Quadrangle, Royal Courts of Justice, London, W.C., or from the Section Commander of a Motor Cycle Section of the N.M.V.

MEDICAL CATEGORIES.

RESPECTING a recent announcement in Parliament that the present system of recruiting by categories would be amended, *The Times* understands that the familiar grouping of recruits is to remain in practice. The classes are:

Class A.—General service.
„ B1.—Garrison duty abroad.
„ B2.—Labour units abroad.
„ B3.—Sedentary work abroad.
„ C1.—Garrison duty at home.
„ C2.—Labour units at home.
„ C3.—Sedentary work at home.

THE FAMOUS TANKS AGAIN PERFORM IMPORTANT WORK.

THE "Tanks," with their crews of motor cyclists and motorists, have commenced their spring campaign of 1917. The correspondent of *The Times* says: "In Feuchy Chapelle two strong positions known as the Chapel Redoubt and the Church Works gave some trouble, and the latter was only finally reduced with the help of 'Tanks,' which did good service on this part of the Front. The troops here took over 2,000 prisoners, and in stubborn fighting inflicted probably heavier casualties on the enemy than in any other section of the attack."

"Tanks" did great service on Thursday in the capture of Heninel and Wancourt, villages in the wing of the Hindenburg line south of the Scarpe. They were especially useful when our infantry were temporarily checked by machine-gun fire. They wiped out a number of machine guns and caused heavy casualties. Some of the "Tanks" were in continuous service for forty hours without rest.

VACANCIES FOR DESPATCH RIDERS.

MANY readers applied to the Royal Engineers' Training Centre, Woburn, Beds, in accordance with our announcement of a fortnight ago that vacancies existed for despatch riders. In some cases, however, no replies were received, due to special arrangements having to be made with the War Office for recruits to be directly enlisted.

A wire of Monday's date from the Commandant of the Training Centre is to the effect that experienced motor cyclists desiring enlistment as despatch riders should forward (1) their full name and address, (2) place of registration, (3) medical category, (4) age and experience, by letter or wire. In cases where notices to join the Colours have been received, applicants should state the date on which they are due to join up.

ROYAL NAVAL AIR SERVICE.

READERS who wish to join the R.N.A.S. should note that men between the ages of 18 and 45, of the following trades, are accepted: Fitters, turners, coppersmiths, motor mechanics, instrument makers, metal workers, carpenters, joiners, fabric workers, cabinet makers, and electricians. Enlistment is for the duration of the war, and the pay varies from 2s. to 4s. per day, with free kit, food, and lodgings. Men with no special experience of the trades required in the Air Service may be entered for general service as aircraft men, second-class, 1s. 3d. a day.

All men are liable for duty afloat or ashore, at home or abroad, and may be detailed to any branch of the Naval Air Service, *i.e.*, seaplane, aeroplane, airship, seaplane ship, kite work, etc.

The selection of a man for service does not imply that he will be trained as a pilot. Application for entry should be made personally or by letter to the Admiralty Recruiting Office in the various towns. Men already attested for the Army are eligible for entry in the R.N.A.S.

The highest pay possible, namely, that of a C.P.O. mechanic, second grade, is 7s. a day, separation allowance 8s. per day.

Many motor cyclists are suitable for this branch of the Service, and also for the R.N. Motor Boat Reserve. Vacancies exist for men of good character as chief motor boatmen, ages from 22 to 45, and motor boatmen 18 to 45. Candidates are entered for service during the period of hostilities only.

A candidate for the post of chief motor boatman must have served his time as a mechanic and be competent to undertake the care of and repairs to internal combustion engines. For motor boatmen candidates must have a practical experience of the running of internal combustion engines. Preference is given to men with sea experience. Motor boatmen receive 17s. 6d. a week, with allowance of £1 1s. a week, also uniform gratuity on entry £5 10s. A chief motor boatman is paid 38s. 6d. a week, with allowance £1 1s. a week, and uniform gratuity on entry £7 10s. Application for entry should be made to any naval or marine recruiter, or to the Officer Commanding,

SIX DESPATCH RIDERS IN FRANCE.
Left to right: Cpls. Freeman, Shute, Cpls. Orr, Andrews, Willoughby, Cpl. Speedie.

Military Notes.—

Motor Boat Reserve Depot, Maritime Buildings, Southampton, or to the Yacht Patrol (Motor Boat Reserve), Victory House, Cockspur Street, London, S.W.

PROMOTIONS.

WE were pleased to read in last Monday's *Gazette* that Lt. W. G. Aston, A.S.C., and Lt. C. T. Newsome, A.S.C., have been promoted to the rank of temporary captain.

Capt. Aston has for many years been a contributor to *The Motor Cycle* on technical subjects, and is a journalist of long experience. His sketches of mechanical subjects were probably unequalled.

Capt. C. T. Newsome is the well-known Rover expert, who has served with the Colours since the beginning of the war.

AFTER TWO YEARS' SERVICE.

AMONG last week's letters from military readers was one from Cpl. H. Russell, a despatch rider to a regiment of Hussars since mobilisation. Cpl. Russell has had two years' active service abroad, the majority of that time being spent in Macedonia. He was formerly connected with Sturmey-Archer Gears, Ltd., of Nottingham, and, after continuous use of one of these gears on active service, thinks as much of it as he does of his Triumph motor cycle—the combination being the last word in reliability, in his judgment. A photograph which he has sent us shows the amount of kit it is necessary for D.R.'s to carry over the "bon" roads of Salonique. On the top of two huge cases, far too big for the carrier, there is a spare cover, and a "tin hat" crowns all. Cpl. Russell makes many kind remarks regarding *The Motor Cycle*.

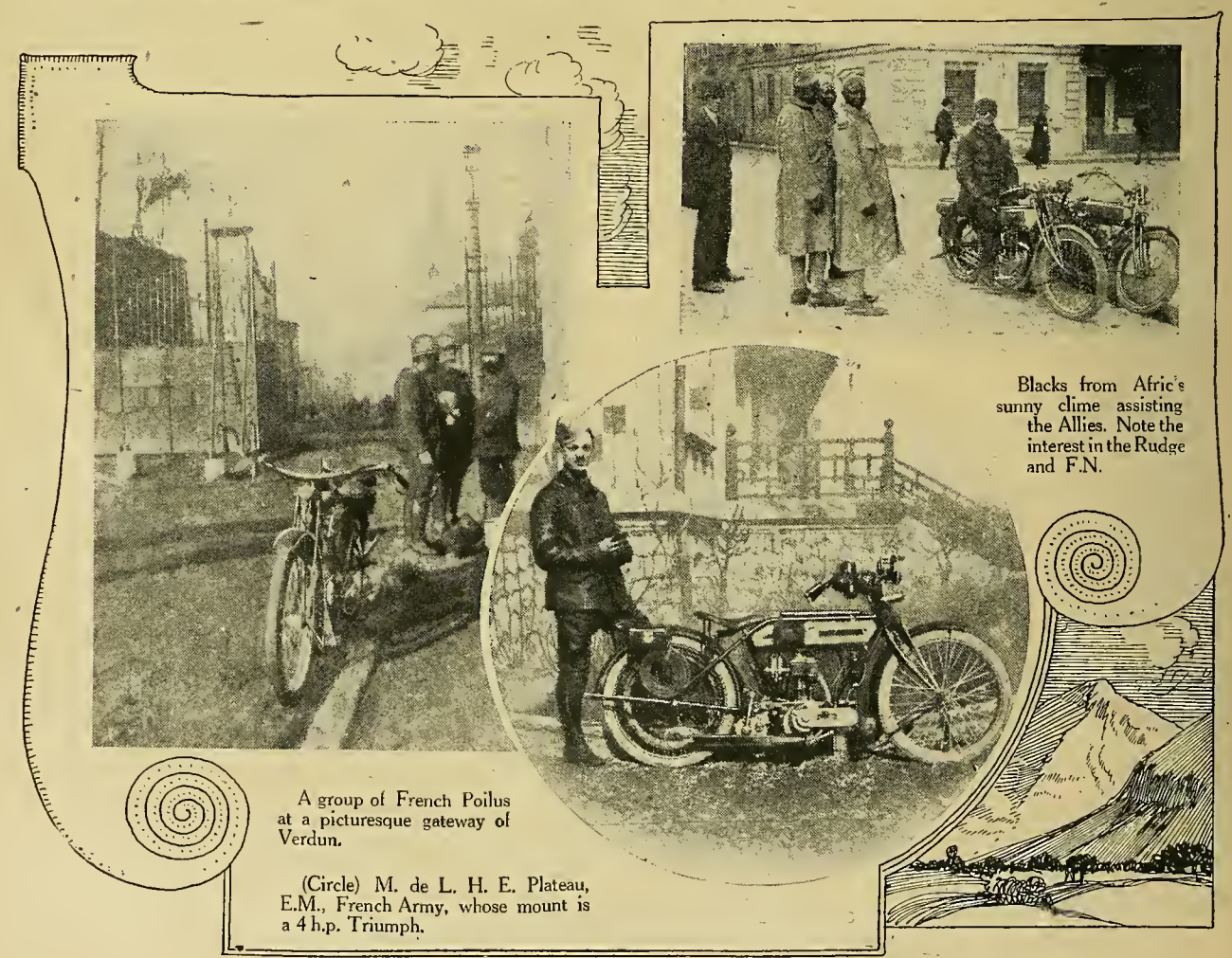
"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

STORES!

A RHYME well known to equipment officers of the Royal Flying Corps is: "Coal and coke and all things dirty, indent for on A.B. 30."

RELIABILITY ON WAR SERVICE.

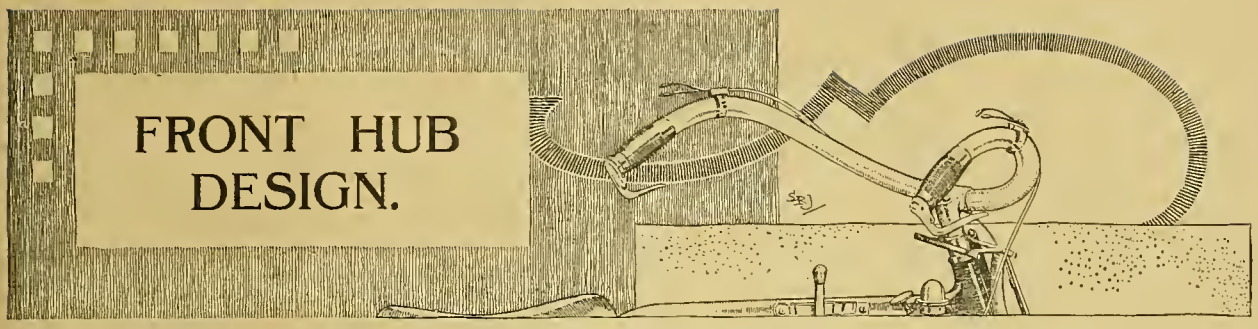
THE controversy "Single *v.* Flat-twin Cylinder Engines," which was at its height in our pages at the beginning of the year, has brought us a letter from Western Egypt, signed by Cpl. L. Neish, to the following effect: "I do not claim to be an authority on the subject, but I should like you to know how my Douglas has stood up to the work it has had to perform. I left England on the 13th of September, 1915, for the Dardanelles, where I landed on the 29th. I was riding all the time we were there, through mud up to the footrests. The bicycle was left out in the open in all weathers, but when the morning came it was no trouble to start up. I left the Peninsula with the evacuation, taking my Douglas with me, and I have used it ever since without a single mechanical breakdown. I have ridden it in all weathers and in the desert, where the sand is inches deep, but I have never yet had to leave it and walk home." This is notable testimony on behalf of the machine to which our correspondent refers.



Blacks from Afric's sunny clime assisting the Allies. Note the interest in the Rudge and F.N.

A group of French Poilus at a picturesque gateway of Verdun.

(Circle) M. de L. H. E. Plateau, E.M., French Army, whose mount is a 4 h.p. Triumph.



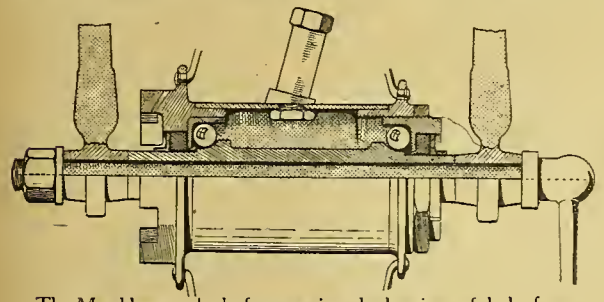
FRONT HUB DESIGN.

A POST-WAR HUB AND TWO READERS' SUGGESTIONS.

WE have received three further examples of methods of excluding mud and water from the front hubs of motor cycles. The first, viz., the hub of the new Matchless, approximates very closely to the ideal put forward by *The Motor Cycle* on March 30th, 1916, and again emphasised by Mr. D. W. Grover on March 8th of this year. Messrs. H. Collier and Sons, in writing to us upon this subject, emphasise the importance of the following points in front hub construction, if the hub is to prove entirely satisfactory under prolonged use in wet weather:

The arrangement of the parts so that a revolving part of the hub projects laterally over the stationary portion of a sufficient diameter to ensure that mud or water would tend to be thrown off by centrifugal force.

The provision of an effective sealing arrangement of felt washers so arranged that their effectiveness is not destroyed by any slackness or misadjustment of the bearings. To



The Matchless method of protecting the bearings of hubs from grit and water.

do this the "seal" must be obtained on the sides of the felt washer and not on the diameter.

The provision of good clearances between fork blades and the revolving part of the hub, so that water running down the fork blades will drop off and not be directed into the bearings.

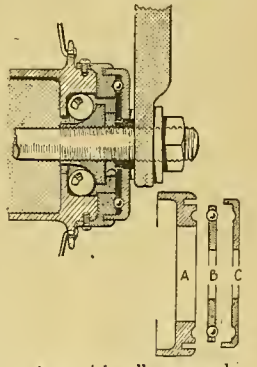
The provision of a lubricating arrangement so that grease or similar semi-solid lubricant can be forced into the bearing from the inside.

As apart from the design of the hub itself, the omission of the usual trapping in the front mudguard for the fork is very desirable, as this trapping has the effect of projecting water and mud on to the upper part of the fork blades, and thence to the wheel bearings.

Our sketch shows how the first four of these desirable points have been attained in the new Matchless hub. It will be noticed, too, that the bearings are disc-adjusting, and therefore not liable to lose their adjustment when the wheel is taken out for tyre changing, which is made a very simple operation by the employment of a knock-out axle.

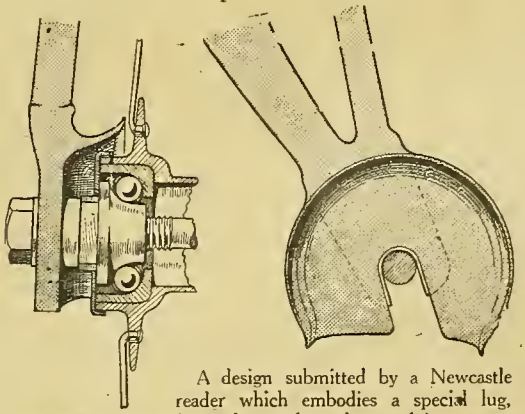
Readers' Ideas.

The second design was sent to us by a correspondent, Mr. W. B. Quick, of Ventnor, and has several points of merit which are made quite clear by the sketch. The piece A is screwed on the end of the hub, next the thrust washer B is placed in position, and afterwards the cover C, which has a flange fitting into a groove in A. It will, therefore, be seen that mud will not easily penetrate to the bearings, but we think the hub would be improved by distance pieces, which would keep the forks farther from the hub. This design is protected, and the patentee would be glad to hear from any maker who would like to take up the manufacture of it.



A provisionally patented design of hub protection by W. B. Quick, of Ventnor.

Mr. W. H. Jameson, of Newcastle, the sender of the third sketch, points out that most of the mud which gets into the front bearings runs down the fork blades, and his idea is to terminate the forks by a special lug designed to carry the mud away from the revolving parts. The efficacy of this design has been proved so far as possible by means of a leather guard, but we still think that distance pieces would be far simpler and at the same time more satisfactory. Still the design has good points, and we are glad to note that the subject is at last beginning to receive the wider consideration which its importance merits.



A design submitted by a Newcastle reader which embodies a special lug, designed to carry the mud away from the revolving parts.

CURRENT HAT

TIMES TO LIGHT LAMPS.

SUMMER TIME.

Apl. 19th	...	...	8.29 p.m.
,, 21st	...	...	8.33 ,,
,, 23rd	...	...	8.36 ,,
,, 25th	...	...	8.39 ,,

Internal Cooling.

The possibilities of internal cooling, opened up in this issue, represent a very big problem, which will doubtless provide food for reflection on all sides.

£5 Reward for Stolen Sidecar.

We are advised by the owner that his 3½ h.p. Premier sidecar outfit, 1914 model with three-speed countershaft gear, was stolen from Red Lion Square, Holborn, on Easter Monday afternoon. He had left the machine for a few minutes only to make a call. A reward of £5 is offered for its recovery.

Gear Control.

A correspondent was recently riding a low-powered machine, the two-speed gear box of which was controlled by Bowden from the handle-bars. For low gear the lever was raised, whereupon the said lever locked automatically in position; for high gear one merely closed the throttle, touched the small catch lever integral with the main gear control, and the high gear dog slipped into engagement without suggestion of jolt.

Extending the System.

It was practically impossible to "snatch" the gears, and during the trial two things occurred to the rider: firstly, that the system would be worth while trying on a Douglas; secondly, that if it could be combined with a suitable friction gear it would form an ideal system for lightweights. But it is to be feared that a friction gear would necessitate so strong a return spring for the automatic engagement of the high gear clutch that the lever would take much hauling up.

Attention to Potential Buyers.

When the Bat Motor Manufacturing Co. receives an application from a motor cyclist, or a prospective rider, for a Bat machine, the enquirer is politely advised by the company that it is not in a position to accept orders, but that the name and address of the enquirer are being filed for future reference. In the meantime, the letter adds, the Bat Co. is keeping an eye to the future, and continuing to experiment, so that immediately normal business is resumed the Bat motor cycle will be marketed with many improvements to maintain its position.

April Showers—OF SNOW.

This April has yielded frosts which are record for twenty-two years. Fair riders prospecting the first spring flowers have experienced a chilly and probably unfruitful time of it.

Motor Cyclists at Kent Potato Sale.

Motor cyclists with families to feed were amongst the crowds that visited Farnborough, on the Sevenoaks Road, on Saturday, where a local farmer sold several tons of potatoes in 7 lb. lots for 1s. Sidecars were useful for carrying the basket or bag of "spuds." One motor cyclist took his lot away in a bag strapped to the carrier. The potatoes are from a Cudham clamp—not far off the test hill.

Two-stroke Rattle.

A member of *The Motor Cycle* staff has ridden for some hundreds of miles a two-stroke which has never possessed the faintest suggestion of that phenomenal ailment known as "two-stroke rattle"—the cause of which has never been definitely settled. Recently the engine suddenly developed this rattle, and its cause was ultimately traced to a very fine crack across the piston head. Does this cast any suggestive light on the mystery for the analyst of rattles?

SPECIAL FEATURES.

INTERNAL COOLING OF ENGINES.
MILITARY NOTES FROM FAR AND NEAR.
THE SPEED OF PARTS.

A Neutral Opinion.

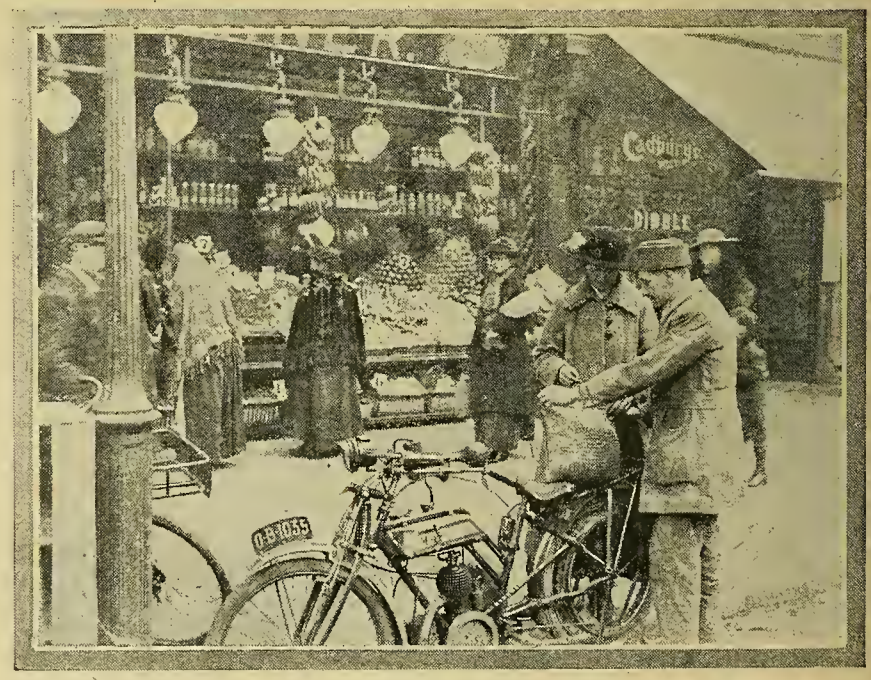
A neutral contemporary states that the "spirits of the people in the British Isles vary considerably." To what sort of spirits does the paragraph allude, one wonders?

Petrol in Paris.

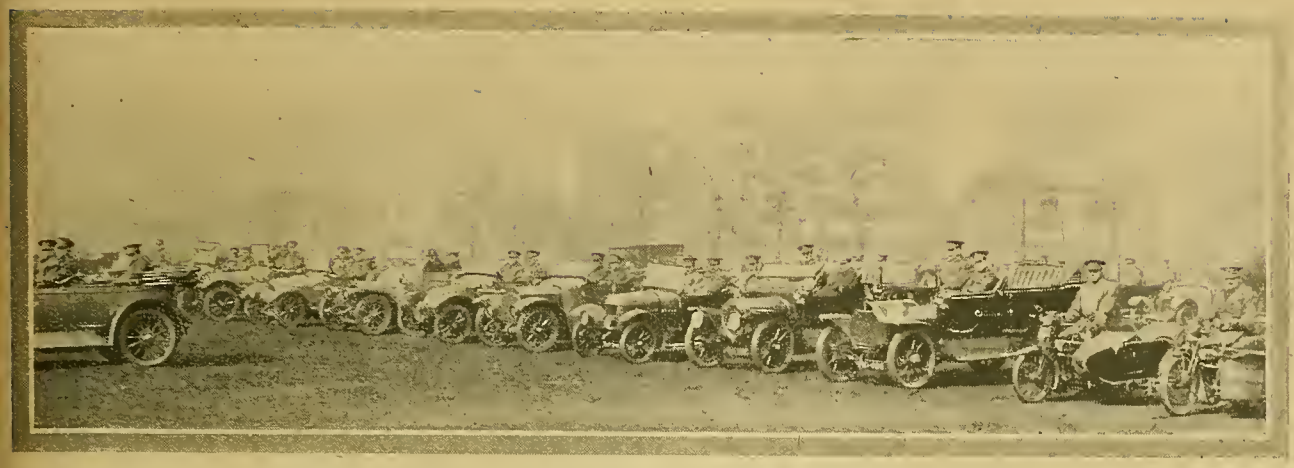
It is announced that in France the petrol problem is to be solved by the issuing of consumption tickets for public service vehicles and those used in national defence, whereas a special card will be required for owners of private cars.

Our Latest Ally.

America having joined the Allies, no longer will the products of that country be regarded as of "foreign" origin. Special tariffs are expected among the nations of the *Entente* after the war, and America will now be placed on the same footing and her goods subject to preferential treatment.



POTATOES!



MOTOR CYCLISTS IN MOTOR VOLUNTEER PARADE AT LIVERPOOL.

The Fifth Lancashire Light Car Battalion Motor Volunteers held a parade in Shiel Park, Liverpool, on Sunday last, the 15th inst. Among the numerous motor vehicles were a number of sidecars, including a Sunbeam, A.J.S., and Triumph.

The National War Funds.

At the week-end the principal war funds stood as follow:

The National Relief Fund (distributed £3,582,509	£6,102,345	0	0
British Red Cross Fund	6,513,763	5	0
Tobacco Fund	128,127	0	0

Motor Cycles by Passenger Train.

Revised charges for the collection and delivery of goods by passenger train came into force on Monday last. The rates for the conveyance of motor cycles, as also for motor cycles with sidecars or trailers attached, are among the increases announced.

A Motor Cycle Manufacturer's Energies.

The president of the Harley-Davidson Motor Co., Ltd., Mr. Walter Davidson, was soon in harness for the cause of the Allies when America decided to join the *Entente*. He has been elected on the Executive Committee of the Wisconsin Defence League, which is associated with President Wilson in recruiting engineers and experts and organising this department for the Army. Mr. Walter Davidson has entered into his duties with zeal and enthusiasm, as anyone who has had the pleasure of meeting him would naturally expect.

Purchasing a Two-stroke.

A two-stroke engine will often run silently and well with the bearings in a worn and loose condition, whereas this does not apply to a four-stroke. The reason for this difference is that, in the case of the two-stroke, there is always some pressure behind the piston, so that the thrust on the main bearings is constantly in one direction. Thus there is not the same likelihood of the members rattling under the reciprocating forces of the piston and connecting rod, as in the case of a four-stroke. Purchasers of second-hand two-strokes should bear this point in mind, and test all main bearings by hand.

A Successful Year.

Messrs. C. Binks, Ltd., report an excellent year's trading. The profit enables a dividend of 12½% free of tax to be paid, whilst £2,585 has been carried forward.

Heavy Fuels.

One of the boys' periodicals has recently concluded a serial entitled "Pilot Jett." Judging from his midnight decisions, Pilot Jett was in the custom of imbibing heavy fuels. Possibly this is why his flint-lock "missed fire" at the crucial moment.

An Era of Progress.

We are learning much in this era of progress. Aeroplane development was simplified by the knowledge gained in motor cycle engineering. But for the motor cycle, knowledge of air-cooled engines would have been in a primitive stage. To-day, the motor cycle perfected, much of the engineering brains of the world are concentrated on aeroplanes.

Volunteers' Gazette.

We are in receipt of No. 1 of a bright journal entitled *The Weekly Gazette of the County of London Motor Volunteers*, which is published every Friday. The first issue contains a portrait of the Commandant, Maj. G. F. Doland. Volunteers intending to join should make application to the Polytechnic, Regent Street, London, W. (Room 5).

Carburation.

Had it not been for more weighty matters, the daily press might have made quite a big thing out of the weather this year. So far as ourselves are concerned, this winter has certainly seen a record harvest with regard to queries in the matter of carburation—owing to cold weather, heavy petrol, and heavier substitutes—and this in spite of the comparatively few riders left to discuss British climatic conditions.

Two-stroke Lubrication.

On this page we recently advised riders of two-strokes not to lubricate too liberally when using their machines only for short runs, and we have since received one or two letters from readers stating that they have obtained better results since taking this advice. Probably the majority of two-strokes are over-oiled, which causes four-stroking, unsteady pulling, etc., and such engines as the water-cooled Scott undoubtedly run best on a minimum of lubricant.

Rough on Lightweights.

The way the American film companies throw lightweight motor cycles about is really astounding. In one recent example the heroine hoards a moving train from the saddle of a Cleveland lightweight, the machine being left to take its chances. In another the "humorist" accidentally rides off the end of a pier into the sea!

Motor Cycle Club of South Australia.

The annual hill-climb of the above club was held at Sellick's Hill (about thirty-three miles south of Adelaide) on January 29th, the course being over a distance of thirty-three miles, and having a rise of 950ft. We give below the results, which were worked out on *The Motor Cycle* formula, $\frac{W}{C \times T^2}$

Results:

CLASS I. SOLO UP TO 300 C.C.

	c.c.	Weight. lbs.	Time. m. s.	Points.
1. Elliott, L. A. (Ell.-Villiers)	269	306	8.7⅘	477
2. Warren, E. (ditto)	269	279	7.54	461
3. Johns, J. V. (Lewis)	297	258	9.28⅘	268

CLASS II. SOLO, 300 TO 350.

1. Lindsay, C. S. (Douglas)..	349	323	7.25	472
2. Limb, A. B. (J.A.P.)	346	301	7.14	461
3. Driver, W. A. (Dalm) ...	318	275	7.35	417

CLASS III. OWNERS, 350 TO 600.

1. Abbott, R. H. (Kent-J.A.P.)	493	337	6.21	470
2. Mott, L. R. (J.A.P.)	493	325	7.10	356

CLASS IV. T.T. MACHINES, 350 TO 600.

1. Abbott, R. H. (Kent-J.A.P.)	493	337	6.1	524
2. Hubbard, W. H. (Norton).	490	359	6.21	504.7
3. Gore, A. J. (Rover)	499	362	6.18	504.1

CLASS V. SOLO OVER 600.

1. Conrad, N. K. (J.A.P.) ..	770	474	6.6⅘	457
2. Fergusoo, E. (Indian) ...	990	450	5.35	450
3. Torode, N. K. (Indian) ..	990	459	5.47	380

CLASS VI. PASSENGER. UP TO 600.

1. Eglinton, L. S. (Kent sc.).	499	763	7.48	642
2. Courtney, W. (Lewis sc.) .	499	744	9.17⅘	480
3. Warren, W. (Ell.-J.A.P.) .	592	641	9.47	314

CLASS VII. PASSENGER. OVER 600.

1. Ferguson, E. (Indian sc.).	990	700	6.59	402
2. Wagener, W. (Blue Bell sc.)	964	698	7.25	365
3. Buckeridge, L. (Indian sc.)	990	891	9.25	282

Fastest time of day: E. Ferguson (7 Indian), 30 m.p.h.

Winner of hill-climb: L. S. Eglinton (Kent sc.), 26.8 m.p.h.

THE GOVERNMENT & UNSOLD NEWSPAPERS.

Give an Order for Regular Delivery of "The Motor Cycle."

HAVE you *ordered* your weekly copy of *The Motor Cycle?* If not we would again urge you to do so at the first convenient opportunity. The Board of Trade will issue an Order shortly prohibiting entirely the custom of supplying copies to newsagents "on sale or return" to meet the requirements of casual buyers. This Order is expected to take effect on May 1st, and after that date newsagents will supply only to definite standing instructions. They will not carry a stock for chance sales, and it will not be possible to pick up a copy of *The Motor Cycle* just here, there, or anywhere, as in the past. Those who require it must order it in advance or risk disappointment.

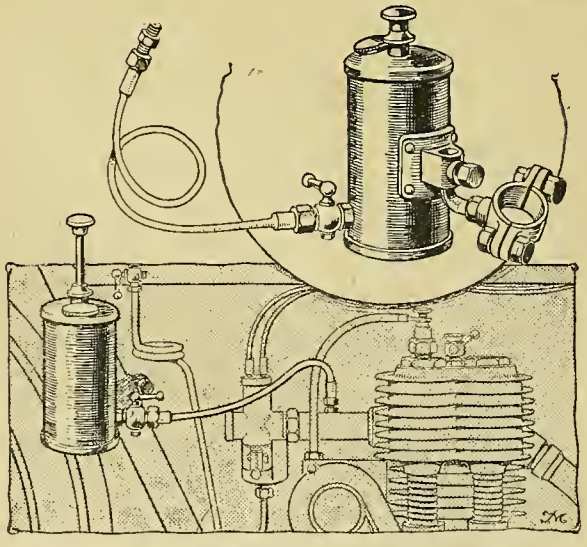
The reason for the Order is, of course, to effect economies in regard to paper, labour, cartage, and railway transport. Although the "returns" of *The Motor Cycle* are a comparatively small item, the total quantity of the "returns" of all the different newspapers and periodicals issued throughout the country must total up to many hundreds of tons each month. They occupy much time, space, and energy in their journeys outwards to the newsagents and inwards to their ultimate destination, the pulping mill. That wastage has now to be stopped in the national interests.

No doubt the majority of our readers have already safeguarded themselves by the simple expedient of giving an order for regular delivery of *The Motor Cycle* to their usual newsagent. Some, however, may have failed to do so, and in such cases we would call attention to the order form now appearing in our advertising pages each week, and again emphasise the fact that *when the Government Order comes into effect only those readers who have placed a definite order for "The Motor Cycle" will be able to obtain their copies.*

AMERICA ENTERS THE ARENA.
A Canadian soldier salutes the American Stars and Stripes flying on the Harley-Davidson by the side of the Union Jack.

THE EUK EASY STARTER.

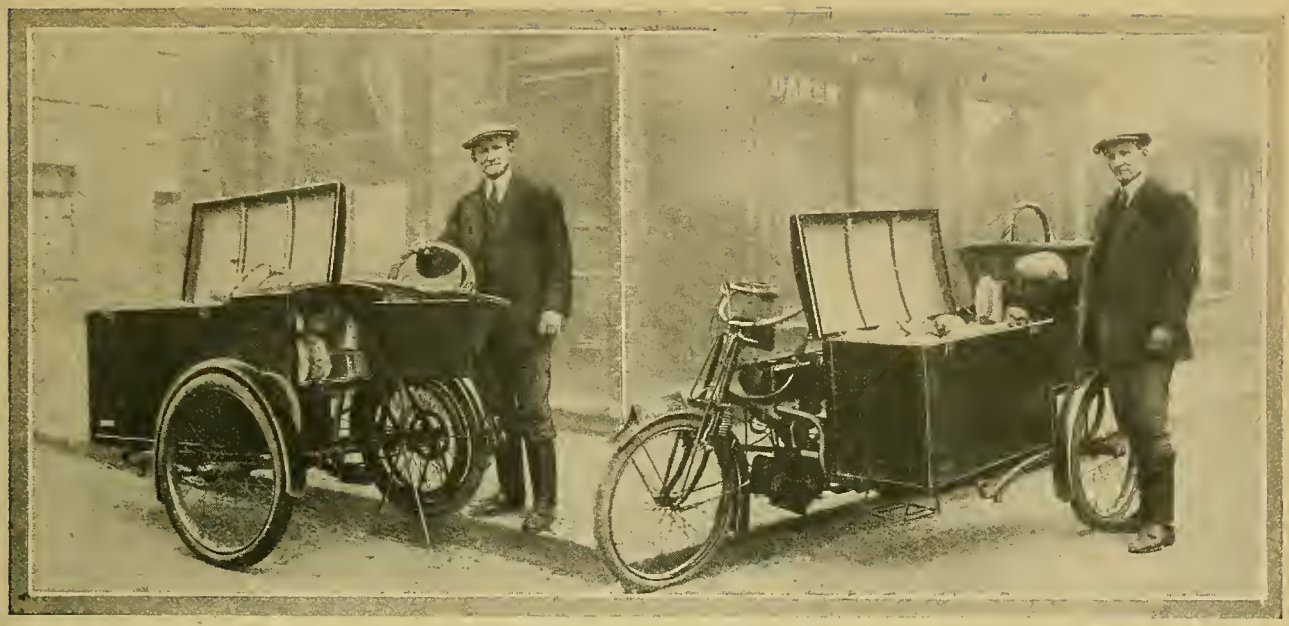
An Easily Fitted Attachment by which Petrol Spray may be Injected into the Induction Pipe.



The Euk easy starting device, by means of which petrol may be atomised by the simple pressure feed.

THE Euk easy starting device is a cylindrical-shaped holder containing a pump of the non-return ball variety. Petrol is sucked into the barrel by the action of drawing the plunger upwards, acting in the same way as an ordinary hand oil pump. When the plunger is forced down the petrol is injected into the tubing which leads to a fine jet in the induction pipe. On the petrol being forced through the jet it is broken up into fine spray, and fills the induction chamber with fine petrol gas which is easily ignited, assuming, of course, that the ignition is in perfect condition.

The extreme simplicity of the system will appeal to many who have not the time or inclination to fit more elaborate methods of easy starting. This device, together with a simple fuel warmer, many of which have been described in past issues of *The Motor Cycle*, will meet the wants of many motor cyclists who have but a small quantity of precious petrol, and yet may have substitute in plenty. This little contrivance is marketed by Messrs. Alexander and Co., 113-115, Lothian Road, Edinburgh, and Messrs. H. Gibson and Co., 49, Chapel Street, Southport.



A Midland baker has put his early model 3 h.p. Singer to useful purpose, and, in spite of its years of service, finds it quite reliaole and incomparably cheaper to run than horseflesh.

MOTOR CYCLISTS & NATIONAL SERVICE.

Enumerating some Immediate Vacancies.

ON page 333 of our last issue we published a complete list of vacancies for mechanics and drivers in connection with the National Service scheme. This list was published at the request of the Employment Department of the Ministry of Labour. Further vacancies are detailed hereunder. Readers who may be competent to fill the vacancies mentioned should visit their nearest Employment Bureau, taking with them this journal, and quote the reference number shown.

M.T. 53.—Twelve Charge Hands for fitting and assembling in motor works; good general fitters; 53 hours per week, and overtime.—Cowley.

M.T. 54.—Six Motor Fitters for motor waggon and commercial van repairs.—London.

M.T. 55.—One Fitter, mostly journal and strap fitting; 54 hours per week.—London.

M.T. 56.—Ten Turners, for aeroplane work; 54 hours per week, with about 6½ hours' overtime; Government work.—Croydon.

M.T. 57.—One Turner; simple screw-cutting, bushing wheels and bearings; 54 hours' per week.—London.

M.T. 58.—Two Steam Waggon Drivers (Manns, of Leeds); hauling coals; used to 5 ton or 3 ton waggon; hours 6 a.m. to 5.30 p.m., and overtime.—Whitley, Dewsbury.

M.T. 59.—One Steam Tractor Driver, used to hauling; 6 a.m. to 6 p.m.; Saturday, 6 a.m. to 1 p.m.; with overtime.—Denton.

M.T. 60.—One Steam Lorry Driver, 3 ton (Wallis & Steevens lorry); 54 hours per week; Government work.—Walsall.

M.T. 61.—One Steam Lorry Driver; practical knowledge of all running repairs for various motors.—Walsall.

M.T. 62.—One Steam Waggon Driver, experienced; 53 hours per week, and overtime.—Walsall.

M.T. 63.—One Motor Lorry Driver—commercial transport; able to do running repairs and assist in loading and unloading; 60 hours per week.—Basford.

M.T. 64.—One Motor Driver-mechanic, able to do running repairs; 1 and 2 ton delivery vans; 72 hours per week.—London.

M.T. 65.—Five Markers-out for aeroplane engine, turbine and Diesel engine work; 51 hours per week; Government work.—Rugby district.

M.T. 66.—Six Fitters for tractor work; 54 hours per week; Government work.—Lincoln district.

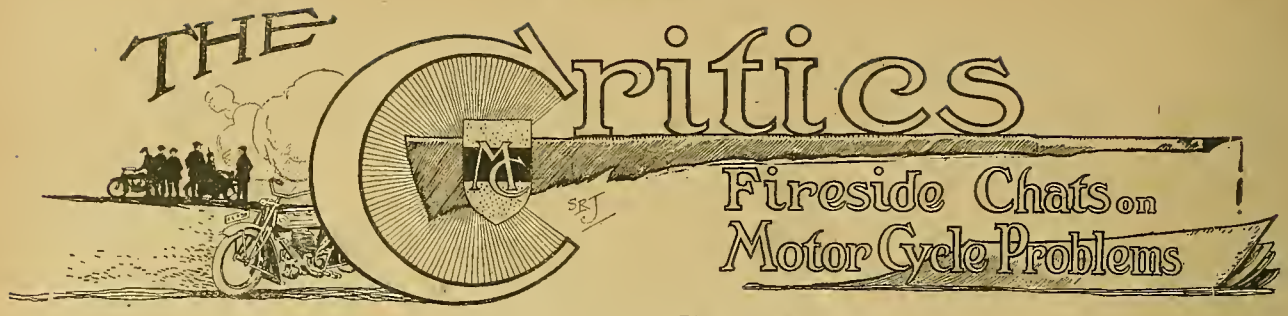
M.T. 67.—Six Lorry Body Builders, experienced on commercial lorries preferably War Department type; 7 a.m. to 8.15 p.m.; Government work.—London.

M.T. 68.—Three Motor Body Makers; 54 hours per week; building and repair work; principally mail vans.—London.

NOISY MOTOR CYCLES IN AUSTRALIA.

As at Home, Overseas Riders are Demanding Silent Machines.

TIMES without number have we drawn attention to the question of noisy motor cycles, and although of late much has been done in the direction of eliminating noise, there is still room for improvement. Especially is this the case with the smaller-powered singles, as well as many of the 3½ h.p. machines. The large twins are not such offenders. In Australia this subject is creating attention, and many people are airing their opinions in *The Melbourne Herald*. One of the correspondents points out that it is not fair to damn all motor cycles alike. He asserts that the single-cylinder variety of European manufacture is the worst offender in this respect, and it must be acknowledged, if one judge without bias, that the majority of American models are less noisy than British machines. Great attention has been paid in the States to the silencing of the valve mechanism and to smooth generation of power, a point which many of our manufacturers appear to make no efforts to solve. In the case of British twin-cylinder machines the valve mechanism is the chief offender as regards noise, exhaust silencing being comparatively good, but this does not apply in the case of the valveless two-stroke. The majority of small two-strokes are absurdly noisy as regards the exhaust gases, while the hubbub is increased by a decompressor which often is open to the air, instead of being connected with the exhaust. The subject of silence may have been dormant of late in this country, but directly the war ceases and motor cycles are again as plentiful on the road as formerly, the strong outcry against noisy motor cycles will undoubtedly be heard again.



GAS OR ELECTRICITY?

AS already reported, it was the D.R., following up the question of kit, who automatically switched on to the subject of electric or gas installations. "Let the buyer display individuality," he said, "especially when it comes to the question of acetylene or electricity. This is not a point the manufacturer can decide for him."

The Journalist thought it *was*. The Novice thought it was not. The D.R., having voiced his decision, stood proudly aloof, likewise the Manufacturer, though between them, their backs to the fire, simmered a half-hearted competition for possession of the warmest spot.

"It's all very well for you to tell us that we ought to have electric lighting," grumbled the Novice, addressing the Journalist, and dusting a veritable avalanche of tobacco ash from his venerable waistcoat, "but what if we don't want it? Personally *I don't!* It takes me all my time to keep the sparking plug wire from shorting. Fancy me with a dynamo, fuses, and a whole chaos of wires and switches! I know absolutely nothing about electricity."

The D.R. suggested a course of electric baths taken in conjunction with rheumatism; if the Novice didn't know something about electricity after that he never would.

"What about acetylene outfits?" queried the Journalist. "It seems to me that an acetylene outfit, with its long lengths of perishable, easily trapped, water collecting rubber tubes, takes more skilful managing than a modern dynamo installation. It always takes me the first two months of winter to get my acetylene installation really perfect, and at the end of that time the tubes are beginning to perish and require trimming. Then the cold weather comes, and the beastly thing freezes up when most wanted. As regards downright messiness—that of keeping the generator in order comes next to looking after the chains."

Short Circuits in Wet Weather.

"What about short circuits on rainy nights and so on?" snorted the Novice.

"No more likely to occur than leakage in the tubing—if the installation is properly wired," replied the Journalist. "Then a short circuit leakage is easier to locate than an invisible gas leakage. By speeding up the dynamo it may be visible to the eye, and at any rate one can usually pounce upon it straightaway by just easing the wires here and there where they touch the frame. The likelihood of short circuits is an overrated proposition."

Here the D.R. joined in by saying that he was always quite content with acetylene till the tail lamp Order came in. Here, he considered, the gas generator met its Waterloo. "You have to search round with a match to locate a leak. If there is no wind it is probably raining. Your gloves are wet, your matches damp, and you are in a dire funk of something exploding. If there is a wind you try to go by your nose, and the smell of gas is generally strongest at the point furthest from the leak. If there is neither wind nor rain there is probably frost, and while you fumble with numbed fingers the bally generator freezes up. I know!"

The Manufacturer thought the D.R. was rather piling it on. "You can have separate generators," he pointed out, "and thus do away with your objectionable lengths of tubing——"

"Incidentally increasing the likelihood of generator troubles by 100%," retorted the D.R.

"Not necessarily," said the Manufacturer. "You can arrange it so that each generator lights either its individual lamp or both lamps, so that, if one generator fails, the other will bring you home. I did this for three seasons, with perfect satisfaction, until I adopted electricity."

"Yes," agreed the Journalist, affably, "with such perfect satisfaction that ultimately you adopted electricity. Go on."

Past and Future Developments.

"Then," pursued the Manufacturer, "we have developed electricity till it has become a serious rival to the gas system, but it must not be thought that it will finally supersede it, for, while the electric system is undoubtedly going ahead, so also is the gas. Wait till we get this new liquid cylinder the motor press has been talking about. In my opinion, electricity and acetylene will both have their devotees for some years to come."

The Novice was dusting his waistcoat again, which meant that he had something to say. It was this, that while electricity might be all right for mechanical men having heavy sidecar outfits, it was entirely off the map for lightweights. "Look at the additional weight!" he added, impressively.

The D.R. said that he was not in the habit of *looking* at weight, though some of the Novice's weighty arguments certainly made him stare. "As regards this latter," he added, "your information is behind the times. In these days of outside flywheels the whole idea is to make the flywheel supply electricity for the outfit, Ford fashion. Could anything more economical be wished for? We must have weighty flywheels. Why not utilise the weight for supplying useful current?"

The Question of Cost.

The Novice was compelled to own that he thought the notion splendid. In fact, he helped himself to some more of the Journalist's tobacco on the strength of it. But he still had a shell to fire. "Price!" he snorted. "You can't get over that. Electricity can never be so cheap as gas."

The Journalist blew a meditative smoke ring. "I was waiting for that argument," he said. "The Novice makes a common error. True that you pay the piper to the extent of £10 or £12 when buying a new dynamo machine, but you get it back when it comes to selling. My last two sidecar machines had dynamo lighting, and owing to this fact I had not the least difficulty in selling them at the price I asked. In short, I made money by expending the £10 or £12 on initial purchase."

"Just so," agreed the Novice. "To-day there are men who want a sidecar outfit de luxe, and don't care much what they spend on it. In normal times these men would buy new machines. To-day they can't get them, so they buy the best thing they can on the second-hand market. Because your machine is fitted with electric lighting it catches their eye as one of the de luxe pattern. If a man likes the machine he will buy it at your price—a fiver doesn't matter. But we *shall not find this type of man butting around the second-hand market after the war*, and a machine with electric lighting will then depreciate as rapidly as any other."

The D.R. agreed that that was quite good for the Novice, but when the latter added that most riders used their lamps only once or twice a month, and therefore did not want luxurious systems, he rather spoilt himself, for, as the Journalist pointed out, it was *because* of the trouble of lighting up that they used their lamps only once or twice a month. Given a system which bathes the road with a flood of light by simply turning on a switch, night riding would become much more popular.

But the Novice was still as loth to part with his gas as a small boy is to don his overcoat. He started on about accumulators, but space does not permit our following this illuminating discussion any further.

Red Cross Motor Carnival in New Zealand.

MOTOR CYCLE SPEED EVENTS AT CHRISTCHURCH.

A MOTOR carnival in aid of the Red Cross was organised at Christchurch, New Zealaud, on February 19th last, a crowd of well over 8,000 people witnessing in beautiful weather what proved to be splendid sport, the whole programme being carried out without hitch of any kind. Great excitement was created on one or two occasions, the crowd rising up and cheering wildly at some particularly daring and spectacular riding.

British Victories.

British machines did well, A. E. Woodman (Christchurch) putting up a magnificent performance on his 4½ h.p. B.S.A. Harley-Davidsons carried off the Heavyweight Handicap, and also the championship.

In the South Island Eight-mile Lightweight Championship for machines up to 350 c.c R. J. Jones on a 2¾ h.p. N.U.I. took the premier award, covering the distance in 9m. 48⅕s. = 49 m.p.h., J. Dawber, on a 2¾ h.p. Douglas, running second in ⅗s. longer time.

In the Middleweight Championship of Ten Miles for machines up to 600 c.c. A. E. Woodman on a B.S.A. won a splendid race in 9m. 54s. = 60.6 m.p.h., an Indian and a B.S.A. running second and third.

The Open Handicap of Eight Miles saw Indians and Harley-Davidsons competing with Douglases and a B.S.A., E. C. F. Hines, on a 7 h.p. Indian, winning after a fine contest, S. Mason (Douglas) running second, and A. E. Woodman (B.S.A.) third. Winner's time was 7m. 42s. = 62.3 m.p.h.

L. Mangham (Harley-Davidson) won both the Ten Miles Handicap and the Fifteen Miles Heavyweight Championship at speeds of 63.9 m.p.h. and 62.6 m.p.h. respectively.

MOTOR CYCLISTS' WINTER SPORT IN DENMARK.

Danish motor cyclists on the ice and on the road. It will be observed that in both instances others have shared in the exhilaration of a spin with a motor cycle by attaching sledges to the machines. All, by the way, are of American manufacture.

AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the figures for the preceding five weeks. Thus the general trend of the market is visible at a glance, though many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average.

Make.	Year.	H.P.	Average for last week.	Previous weekly average
A.J.S.	1916	6 combination	—	£96
„	1916	4 combination	£90	£99
„	1914	6 combination	—	£56
Allon	1916	2¾ 2-speed	—	£33
Ariel	1916	3½ 3-speed	£55	—
„	1915	3½ 3-speed	—	£45
„	1914	5-6 combination	—	£55
Bat	1914	6 3-speed	—	£46
Bradbury	1914	4 2-sp. sidecar	—	£44
Brough	1916	3½ 2-speed	£58	£54
B.S.A.	1916	4 sidecar	£60	£65
„	1915	4 sidecar	£57	£59
Calthorpe	1916	2½ 2-speed	—	£36
Clyno	1915	2½ 2-stroke	—	£28
„	1914	6 combination	—	£65
Douglas	1916	2¾ 2-speed	£45	£48
„	1915	2¾ 2-speed	£49	£47
„	1914	2¾ 2-speed	£38	£37
Enfield	1916	6 combination	£78	£76
„	1916	3 2-speed	£53	£45
H.-Davidson	1916	7 combination	£74	£82
„	1915	7 combination	£65	£68
Humber	1915	6 combination	—	£65
Indian	1916	5 combination	£63	£66
„	1915	7 combination	£61	£70
James	1916	4½ combination	£65	£71
Levis	1916	2½ Popular	—	£25
„	1915	2½ Popular	£18	£21
Matchless	1915	5 combination	£72	£75
New Hudson	1916	2-stroke, 2-speed	—	£28
„	1915	4 combination	—	£48
Norton	1916	3½ 2-speed	—	£47
„	1916	4 combination	£74	—
„	1915	3½ T.T.	£47	£32
P. & M.	1915	3½ combination	—	£65
„	1914	3½ combination	£44	£55
Premier	1914	3½ 3-speed	£45	£47
Rover	1916	3½ 3-speed	£51	—
Royal Ruby	1916	2¾ 2-stroke	—	£30
Rudge	1916	3½ Multi	—	£45
Scott	1916	3½ combination	—	£60
Sunbeam	1916	3½ combination	£73	—
„	1915	3½ combination	£80	£77
Triumph	1916	2-stroke	£40	—
„	1915	4 countershaft	£55	£50
Zenith	1914	3½ T.T.	£40	—

SLEDGING IN DENMARK.

WE are indebted for the photographs reproduced on this page to Mr. N. P. Rasenluna, of Randers, Denmark, who states, in a letter to us, that he is particularly interested in English motor cycles; and being attracted by the sledging photographs we showed on February 15th, was tempted to send us two prints taken whilst on a sledging trip, one of the photographs being taken on the road, and the other on the ice during the recent frost.

This is one way of extending one's pleasures to others in the winter time. An objection often advanced against motor cycles is their limited seating accommodation. All the machines shown are powerful American twin-cylinder mounts, a type more popular abroad than at home. But then few countries have road surfaces to equal those in these isles, and consequently the high ground clearance, the 28×3in tyres, and the high-powered engine are strong points of attraction to a foreigner.

After the war, no doubt British manufacturers will endeavour to extend their sales of motor cycles in Scandinavia as well as Russia and other countries.

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

MOTOR CYCLES FOR RUSSIA.

Sir,—It is with the greatest interest, and no small amount of envy, that I have read in your splendid issue of the 5th inst. the first-rate descriptions of the British machines ordered by the Russian Government. Truly fortunate are those to whose lot fall one of these machines. As a D.R. in the Signal Service, with over two years' experience in Scotland, England, and now Ireland, I can appreciate what a machine like those described would be to a D.R. I have ridden a 2¾ h.p. Douglas nearly all the time, and find it an admirable little machine, but here the conditions make it rather gruelling; high winds, very bad roads, and some long, steep gradients certainly take it out of a machine of 2¾ h.p., which has been on the road since early in 1915. I cannot understand why our own Government has fought shy of the 4-5 h.p. twin for so long. For my own part I think a machine of that type would be excellent for D.R. work, in this country at any rate.

GORDON C. REID (Cpl., R.E.).

Fermoy, Co. Cork.

CLUTCH CONTROL.

Sir,—Your editorial in the issue of April 12th gladdened my heart and raised my hopes—for a moment. You have been at it before, but the old game goes merrily on, and foot control seems as firmly entrenched as ever. You emphasise the necessity of handle-bar control for despatch riders. There are others. Let an example suffice.

My wife rides a lady's Douglas and *never* uses the clutch. On the flat, or even a slight incline, no clutch is necessary. A child could start the thing with a push. But on a really stiff hill a clutch is handy, or, in this case, "footy." Now, if one tries to balance the machine with one foot on the ground and the other on the clutch pedal there is all the making of a pretty acrobatic feat when the machine has its nose up a stiffish hill. But I will speak truth and shame the ——, or praise the Douglas. I have seen my wife start with a push in the middle of a really stiff hill *without* any great exertion rather than use the clutch, which would have been far more difficult. The moral may be taken as you please. A clutch is not a necessity on a 2¾ h.p. Douglas, but on the very few occasions when it might be handy it is only "footy," and, therefore, practically useless.

Keep hammering away at this reform, sir. In about twenty years the manufacturers will wake up to the necessity of it.

ÆSCULAPIUS.

Sheffield.

BRITISH MAGNETOS.

Sir,—In your issue of April 5th, in an article referring to the new twin motor cycle produced by Messrs. the New Rover Co., of Coventry, you make reference to the fact that the cycle you saw was fitted with an E.I.C. magneto, and express surprise, and "natural surprise, too," on learning that the cycles to be supplied to fill the contract, "which is a Government contract," would be fitted with American magnetos.

We feel, under the circumstances, that it is necessary for us to communicate with you on this point, because a wrong impression may, we fear, be created in the minds of your readers. Some may imagine that it is a slur on the quality of British magnetos.

We beg, therefore, to mention that the E.I.C. magneto proved to be a most satisfactory machine in every way, passing all Government tests with flying colours, and likewise proved perfectly satisfactory on the cycle manufacturers' road tests. So satisfactory indeed, that Messrs. the New Rover Co. placed their contract for E.I.C. magnetos, and delivery dates, etc., were all agreed.

For some unexplainable reason a department of the Government instructed and insisted upon the New Rover Co. cancelling their contract for E.I.C. magnetos, which are all-British, and instructed them that they must place it with an American firm for American magnetos. Why, we do not know.

It was not on account of price.
It was not on account of quality.
It was not on account of reliability.
It was not on account of delivery.

Therefore, we repeat, why? Why do our Government insist upon American goods being used when British goods are available of proved better quality and efficiency, and at the same time talk of the necessity to save tonnage and keep money in the country, and establishing new and valuable British key industries?

THE ELECTRIC IGNITION CO. (1913), LTD.,
Arthur Cox, Managing Director.

COMBINED VALVES.

Sir,—Your article in *The Motor Cycle* of April 12th on concentric valves has interested me exceedingly, and recalls to my mind at least two motor cycles that have been fitted with valves of this type. One was a pacing machine built *circa* 1908 and fitted with a five-cylinder Esnault-Pelterie engine, the other a make known as the Bailleul, and exhibited at the Paris Salon in 1904. Sectional drawings of this valve construction were published in *The Motor Cycle* for December 19th, 1904, a copy of which I happen by chance to possess.

This valve was operated by two separate rockers, as in the Pipe design, but the rockers in turn were operated by concentric tappet rods, similar to a construction employed on a special Humber engine built, I believe, for the 1910 T.T. race.

While it may be possible successfully to design and construct a concentric valve assembly, yet it seems to me that there are many drawbacks, not, I hope, insuperable. They are:

(1.) Excessive weight, which, as stated in your article, means a difficulty in obtaining quick lift, etc., and militates against high speeds; against this, owing to the enormous area, a very small lift should suffice.
(2.) Expensive to manufacture.
(3.) So large an exhaust valve must be liable to warping.
(4.) Such distortion would very likely cause binding.
(5.) The area of contact between the tubular sleeve of the outer valve and the guide is enormous, and would be difficult to lubricate satisfactorily.
(6.) "Grinding in" the outer valve would be rather troublesome.
(7.) A difficulty in arranging for passages to conduct away the exhaust gases to the silencer in some designs.

As regards the Parsons design, this has been largely used in marine work for engines running on paraffin, and this fact, I believe, is the *raison d'être* for its employment, the incoming gases coming in contact with the hot exhaust valve, which acts as a pre-heater, thus ensuring efficient vaporisation.

I do think, however, that there is much to be said for concentric valves from the point of view of efficiency, and I certainly look forward to successful designs in the future.

C. STANBURY MADELEY.

AIR V. WATER-COOLING.

Sir,—I do not see the necessity of water-cooling the 1,000 c.c. single proposed by Mr. Hitchcock. An engine of that size would seldom be working at full power, and if a long stroke were used to give good cooling air-cooling would probably succeed. There would be no necessity for a very high compression, and this would also tend to cool running. The engine would probably have to be mounted in a sloping or even horizontal position if the conventional tank position were retained.

A really heavily rimmed outside flywheel combined with spring chain drive would make the torque as smooth as one could desire, notwithstanding what "W.F.C." says. It is merely a matter of weight. Excessive acceleration is neither desired nor practised by the great majority of sidecar owners, and as the extra weight is revolving as well as moving forward, the energy stored would be very useful in rushing steep rises. I think the sound of the exhaust deceives one into imagining that the torque of a single is worse than it really is. After all, no engine is intended to be run on top gear at 5 to 10 m.p.h. with sidecar, and at usual speeds jerkiness is non-existent.

To continue, I suppose one could not go the length of doing away with the gear box if a low gear and road speed would satisfy, say 6 to 1 and 20 m.p.h., and precipices avoided. I have climbed, as a beginner, every main road hill between London and Peterhead in both directions with a 558 c.c. engined combination, 22 to 29 stone load, and never used a lower gear than 7½ to 1.

Personally, I should prefer a large slow running engine to a small one of high r.p.m., *even if the power were no greater*. When I had got the exhaust of my single quiet, the clatter from the valve gear was appalling, so much so that I returned to the noisy exhaust as a more pleasant sound. No doubt some power is lost with low compressions, silent valve gears, and exhausts, but I for one would willingly increase my petrol consumption (and that is what it means) from 90 m.p.g. to, say, 75 m.p.g. to get them. Surely some maker can solve the problem of a really quiet valve gear without sacrifice of power. Perhaps the two stroke three-port system is the ideal. Why not a large long stroke two-stroke single without gear box? I suggest dimensions (either two or four-stroke) 86 mm. bore and 172 mm. stroke, giving 1,000 c.c.

I would remind "W.F.C." of the Excelsior 5-6 h.p. single of 811 c.c. compared with the Rudge's 750 c.c.

I am aware of conflicting ideas in this letter, but I believe that a practical and comfortable machine could be designed by using a suitable combination of good points

W. R. DEUCHAR.

Sir,—I must thank "W.F.C." for his criticism of my letter, and in reply would say:

(1.) Air-cooled head. In all recent Scott machines *cylinder only* is water-cooled. The advantage of an air-cooled head is that it can easily be detached without breaking water-tight joints. As to overheating, the head cannot get too hot, as heat is conducted away by the copper washer at joint into the cylinder. As to the joint being difficult to keep gas-tight, one of the most practical 3½ h.p. machines on the road, the Blackburne, has detachable head. It is all a question of design.

(2.) Boiling of water in water jacket. I, of course, proposed to use a radiator, but one much stronger and also smaller than the honeycomb pattern, which with its large number of *soldered* joints is apt to give trouble, as I know from experience. By casting fins on the water-cooled cylinder, water inside could be kept much cooler, and consequently a small radiator with strong copper pipes, *riveted as well as soldered* at joints, could be used.

(3.) Easy starting by filling with hot water. Petrol in float chamber may be just as simple, but where is it coming from at the present time?

(4.) Torque of a single not good enough when sidecar is attached. In the name of reason, why? It is all the other way; a single is not nearly so satisfactory for solo work on bad or wet roads, and here the twin or "four" will always be required, but for sidecar work, skidding being absent, evenness of torque need not be considered. Also extra weight of sidecar and passenger acts like a flywheel and keeps the engine steadier.

The largest "big single" on the road is the 811 c.c. Excelsior, and this is a very smooth-running engine, so one of 1,000 c.c. can hardly be called impractical.

(5.) Outside flywheel. This is not to make torque more even, but to ensure easy starting, especially in cold weather. Every motorist knows that inside flywheels covered with frozen oil act as a strong brake on the engine.

(6.) I have already written on this question of even torque. For pleasure riding the torque must not be too even, as otherwise there is no sensation of power in the engine. The fewer and more heavy the explosions per second, the more the feeling of power when driving. An engine with perfectly even torque is no more exhilarating to drive than a cable or electric tram.

(7.) Galvanising causing brittleness. This is an old delusion. The mere fact that all overhead telephone and other electric work is done with *galvanised* steel cables and stays shows that the above is not the case, as maximum strength combined with lightness is required for this work.

(8.) For heavy *solo* work it would be difficult to find a better machine than the 6 h.p. water-cooled Humber, but for sidecar work it is distressingly "tame" *(like all multi-cylinders)* for reasons given above.

M. HITCHCOCK.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—I have read with interest the letter from Mr. Gray in your issue of the 29th ult., and would now direct his attention to the fact that, in my previous communication, I referred to *visual* range finding, or, to be still more precise, distance estimation, in which each man is called upon to use *his own judgment*.

Your correspondent has apparently misread this, and proceeds to give me my "quietus" by a reference to the method of using and the principles of a type of optical or mechanical range-finder.

In view of my personal experience of one-eyed men who have proved themselves capable of *judging* distance with credit to themselves, even in competition with men in possession of their full faculties, I feel that I should be failing in my duty were I to allow Mr. Gray's statements to pass unchallenged.

It is a well-known fact that theory—however good—is not always borne out when practically applied.

As some form of examination or test as to ability will perhaps at some future date be made of aspirants to driving licences, it would, I feel, be of interest to hear of the driving experiences of those of your readers who are afflicted in the manner under discussion, with special reference to the circumstances of any accidents in which they may have been involved. C.Q.M.S.

Blyth.

Sir,—I am interested in the letter of Mr. Gray and the reply of Sec.-Lt. Doherty regarding the ability of a one-eyed man to judge distances.

While agreeing that the loss of one eye destroys the stereoscopic effect, and thus renders the judging of distance difficult at first, I should like to point out that the single eye has a feature by the development of which it is able to detect and convey to the mind differences in distance of the various objects before it.

I refer to the effort (unconscious to persons with normal eyes) required to alter the focal length of the lens of the eye. It must be remembered that the lens "works" at a very large aperture, and therefore possesses little "depth of focus," thus enabling a person with one eye to judge distances with tolerable accuracy after a little practice. Doubtless Professor Halliburton would agree that the feature mentioned above enables a single eye to judge distances, but it was overlooked by him when he stated that the "only" method was by the obviously more efficient stereoscopic vision provided by nature.

However, a few minutes' consideration and a few simple experiments will prove to anyone that the possession of a single eye only should not debar a man from driving a motor vehicle, as near objects (*i.e.*, nearer than "infinity") only need be considered in this connection, and it is at short distances that the method named is most efficient.

There is, or at least was, a simple form of range-finder for the use of photographers constructed on this principle and marketed in this country. ALEX. LACEY.

PETROL OR PARAFFIN.

Sir,—I was particularly interested in the method of utilising paraffin described in your issue of April 5th by Mr. Leonard R. Jones. May I point out, however, that Mr. C. Pullin's patent, previously described, anticipates the dual float chamber and two-way cock?

Both Messrs. Jones and Pullin have, it appears, overlooked a most simple method of constructing their two-way cock, or rather the plug portion. They will find that by utilising a straight bore with a bore at right angles, forming a T, their cock is capable of a third position, that of using a mixture of both fuels, which is particularly advantageous for hills or traffic. This construction is embraced in my complete specification No. 12,046, filed January 29th, 1917.

I trust this may be useful to Mr. Jones and any who may utilise this essentially simple yet effective system.

GORDON C. HUFFAM.

A VARIETY OF CONDITIONS FOR DESPATCH RIDERS.

Sir,—I would like to make a few brief remarks on the subject of a letter written by two D.R.'s with reference to the condition of roads, and especially regarding pot-holes.

I cannot imagine where the two D.R.'s have been spending their fifteen months' experience of riding. Have they ever been on the Somme? I should say not. Had they any riding to do after the recent great frost, when some of the roads, as such, were entirely missing? Can you imagine the front wheel of a motor bicycle dropping into an 18in. pot-hole? Not in England, certainly; but out here, yes. I have experienced it myself, on main roads even.

I am *not* a D.R., and so do not claim to be "spinning the yarn." But I have covered a few roads in two years' Active Service.

SUB.
B.E.F.

Sir,—*Re* your two R.E. D.R.'s remarks on road conditions in France in *The Motor Cycle* for March 29th. We are but two humble A.S.C. D.R.'s, but are proud to say that we ride from a point a little over a mile behind the line—very seldom more than seven miles—and, of course, we are allowed no lights. This differs greatly from your correspondents who ride from a town about ten or twelve miles behind the line, and very seldom come within a radius where they are not allowed lights. Most of the roads we have to ride over have holes not 6in. deep but 16in. deep (if this statement should be disputed we can furnish you with the names of many D.R.'s, R.E.'s, A.S.C.'s, and R.F.C.'s), and a point worth remembering is that what we have said is exclusive of shell fire and the shelling of roads over which we have to ride. Often when we are coming up at night time, when we get to a certain point we find that all transport has been stopped because of the roads being shelled, and the only traffic allowed to pass is the D.R.'s and men on foot. We can also say that we have had more months' service out here as D.R.'s than your correspondents, and we have been at many different parts of the line. We may add that we ride the trusty Triumph, which stands up to the work remarkably well—otherwise the bicycle that does not let one down.

We always look forward to your blue cover—*The Motor Cycle*—which we receive each Tuesday. Wishing you every success in the future,

A. A. JACKSON, A.S.C. D.R.
B.E.F. G. HARMOND, A.S.C. D.R.

Sir,—As divisional and brigade D.R.'s, unit R.E. "Signals," we wish to correct the impression given by some fortunate individuals out here who contributed to *The Motor Cycle* of the 29th March. We are not out to scare, but like to see justice done. Now as regards road conditions out here, there are scores of shell holes on these roads ranging from one to three feet deep; lorries get stuck, and generally manage to make an 18in. rut before getting out, and horse transport adds the usual 3in. or 4in. ruts during this bad weather. Also mine craters are frequent on cross roads, and average about 40ft. deep, and the "road" round them is in many cases impassable to motor cycles. Up at Brigade Headquarters, where it is not always healthy on top, being generally amongst umpteen batteries, it is impossible to keep the roads in the fine condition your correspondents have the luck to meet, as transport can generally get up after dark only, and the roads are then required for rations and ammunition. We have "good" roads about six miles behind the line, but very bumpy, and we would not care to let an 8 h.p. twin out on them. The mud is also very bad just now, and it is not unusual to clean your guards out and get them again clogged before the engine fires, the only remedy then being to remove the guards. This type of road is where the Triumph, with its kick starter, clutch, and low gear, scores. Only the other day the writer was running alongside a Douglas, the mud being up to the rim of the flywheel, it being possible to get through owing only to its being "very liquid." As regards shell fire, everyone up the line takes his chance, and none more so than "runners," generally infantrymen. We have lately used horses, owing to the impassable state of the roads. To conclude, our motive in sending you this along is that we do not consider it fair of men who have "cushy" jobs out here to belittle their comrades' difficulties.

France. B.E.F.

REMOVING A PULLEY.

Sir,—The idea of easily removing the fixed flange in a variable pulley seems to be generally unknown, the use of a hammer with wedges being considered the correct and only way. Last week I was having a new pulley made, and tried the following plan, which was immediately successful. After removing the large outside locking nut, also the outer flange and the inside locking nut, I inserted in the place of this latter a square inch of rubber belting against the engine-shaft. Then, replacing the large outside locking nut and gradually tightening it up, the flange came off the bevel. I have seen two experienced engineers on separate occasions vigorously using a hammer on my engine-shaft instead of this simple operation.

R. G. HOWARD.

A STEPPING STONE SPARKING PLUG.

Sir,—With reference to a request contained in a note by "Ixion" on page 295 of your issue of April 5th, in relation to plugs giving a number of sparks, it may be of interest to your readers to know that this is one of those ingenious ideas which is continually cropping up, and has been quite genuinely "invented" several times.

One of the first records of the system we have is the Darop patent, which is now ten years or more old. This plug was constructed with a mica insulator, the inner end of which projected in front of the screw thread of the plug. Inserted among the mica washers forming the insulator, and close to the head of the central electrode, was a nickel ring, which in its turn was adjusted to come close to the inner bore of the body of the plug. In this way it formed a "stepping-stone" between the central electrode and the body.

In 1911 a Birmingham gentleman, Mr. Smith, invented a similar plug constructed with a porcelain insulator, which was illustrated in one of the motor cycling journals at that time. We understand that Mr. Howard Newman, the well-known tourist trophy rider, who is now on active service in France, quite recently patented an idea on the same lines.

The principle is that of a spark gap within the engine, and to the extent that a spark gap is good, the model also is good, that is to say, it is suitable for engines of moderate temperature where oil is troublesome.

The current from the magneto, although apparently instantaneous, is not actually so, and there is a period of time during which the voltage in the high-tension circuit is piling up until it finally bursts across the spark gap. During this period there is a liability for a certain amount of current to spread into the oily deposit on the surface of the insulator, and in consequence to run to waste, resulting in a weak spark. With a spark gap there is a definite gap provided before the working spark is reached, and this first gap dams up the current until it is sufficiently powerful to bridge gap No. 1, which in effect results in the said current charging full force at gap No. 2, and consequently giving a more powerful spark. The only trouble with plugs of this kind is that they involve an isolated piece of metal or "stepping-stone" lying within the engine, which "stepping-stone" is unable to dispose of its surplus heat. The result is a plug which in a modern engine is prone to pre-ignition.

THE SPHINX MANUFACTURING CO.

SUMMARY OF CORRESPONDENCE.

A Dublin reader tells us that he also has received from the Electric Ignition Co. the same generous treatment as accorded to Mr. R. W. L. Nottram (see *The Motor Cycle*, March 29th, page 288).

ZENITH

— the motor cycle with the Infinitely Variable GRADUA GEAR, which instantly adapts the drive to the road conditions on the spot.

Keep your eyes open

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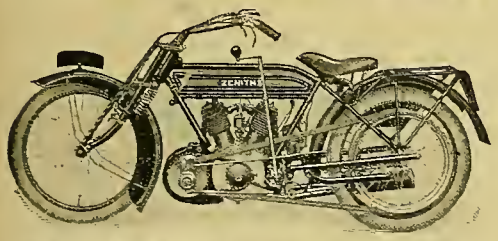

The BIG "8" ZENITH, "Clutch and Countershaft" type, with Kick Starter, Positive Locking Clutch, longest Belt Drive, and the Infinitely Variable Gradua Gear.

THE MARK that means SO MUCH!

For the present—owing to national circumstances, it is impossible to deliver to private riders, but we can supply machines for National Service where the buyer's claim is recognised by the Ministry of Munitions and a permit granted.

ZENITH MOTORS, LTD.,
Contractors to H.M. Government,
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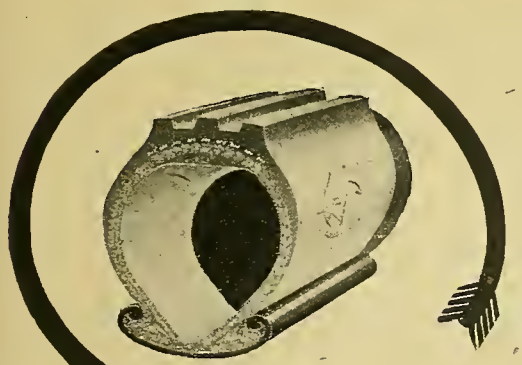
ROYAL ENFIELDS and PALMERS for RUSSIA

We show below a photograph of the first batch of Royal Enfield motor cycles intended for the Russian Government, representing a portion of a large order recently placed. These models are built practically to standard specification, except that they are all finished in the "Service Green" colour. A striking testimony to the value of Palmer productions is afforded by the fact that they are fitted with



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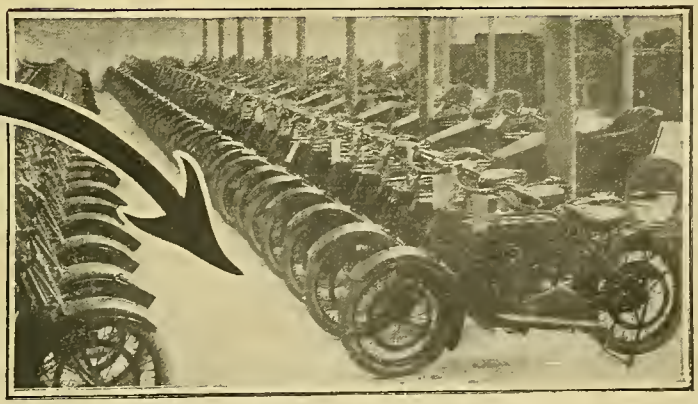
(ORIGINATORS OF THE THREE RIB TREAD)
CORD TYRES



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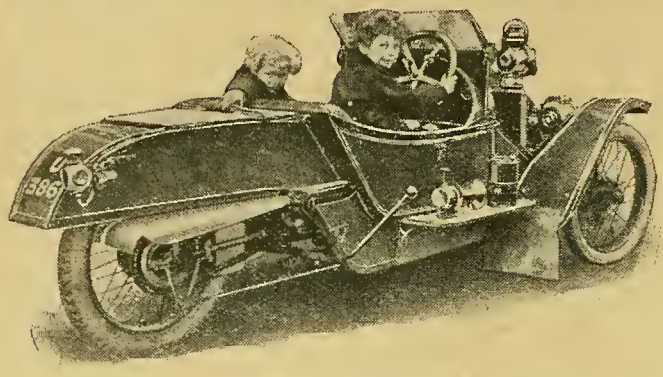
A refinement which appeals to all Morgan owners. **(Registered Design)**

See Editorial comment in "The Motor Cycle," Jan. 25th, 1917, page 77; also "The Light Car," Jan. 24th, 1917, page 86.

The Jaffa Transmission Guard is specially designed to protect the whole of the transmission of the Morgan cycle car, including chains, sprockets, countershaft dogs, main springs, brake bands and back forks. Quite rigid and does not rattle. Does not interfere with the adjustment of the rear wheel or chains. Very easily fixed.



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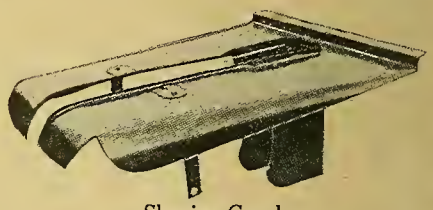
Price 35/-

Complete and ready for fitting.



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Full particulars from—

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They are designed by clever engineers, and we can recommend them with every confidence to motor cyclists who are out for comfort *and reliability.*

SEE THE

"GRADO" MULTI-PULLEY

which enables you to start like a car. Takes your machine and sidecar up hills impossible without. It gets you safely through the thickest traffic, besides enabling you to travel over the greasiest roads with safety. The price for Triumphs, Bradburys, etc., is **£3 3s.**; ball thrust models, **£4**; lightweight models from **£2 10s.** Recessed pulleys, **10/-** extra.

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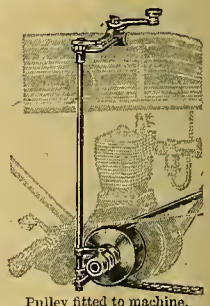
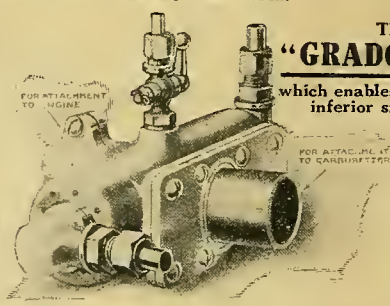


Pulley fitted to machine.



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It heats the paraffin before entering the float chamber, and also defuses and thoroughly heats the mixture before entering the cylinder. Nothing more can be desired.

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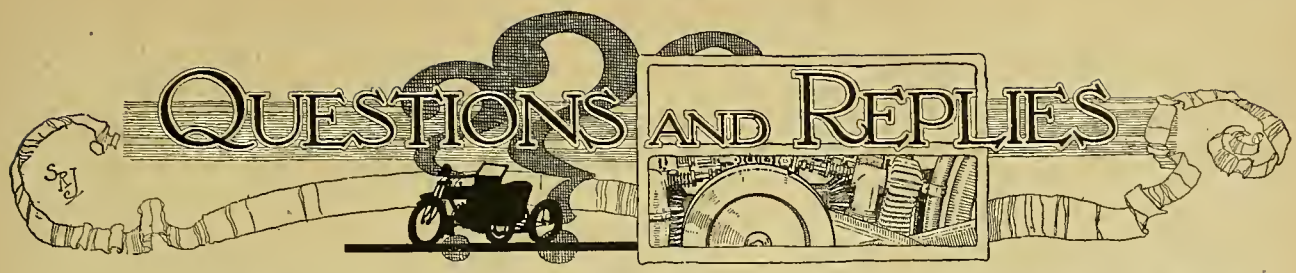


A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Running on Heavy Fuel

As an inexpensive form of vaporiser, would copper tubing wound about six times round the exhaust pipe, thence round the small induction pipe of the carburetter, be efficient for paraffin or petrol substitute?—T.S.

The device in question would possibly do fairly well in warm weather, but it is essential to take the air in warm, while it would also be beneficial to bring the fuel pipe round the cylinder head before reaching the carburetter.

Hub Gear Ratios

Do you consider a three-speed hub gear reliable for a motor cycle? I have the offer of a Rover fitted with an Armstrong gear. I like the machine, but have been advised that I must expect a lot of trouble from the gear. I shall be grateful if you will tell me the gear ratios, with a top speed of 5 to 1.—E.W.

The gear is fairly reliable if carefully looked after and used with judgment. If the gear is a Mark VI. or VII. Armstrong, with a top speed ratio of 5 to 1, the second would be 7¾ to 1, and the first 11½ to 1. If it is a Mark II., III., or V., the second would be 5¾ to 1, and the first 9½ to 1.

Unsatisfactory Running.

My machine is a practically new 2¼ h.p. two-stroke, and I have just decarbonised the cylinder for the first time. The magneto is an M.L., and the carburetter an Amac. After having run five or six miles the engine begins to misfire, and starts back-firing out of the top of the carburetter. When this occurs on a slight incline the engine knocks. If I then shut off and start up again a few minutes afterwards the machine will go all right for a mile or so. I might mention the machine behaved like this before I decarbonised the cylinder, but thinking a gummed-up piston ring and carbon deposit were the only troubles I proceeded to remove them. I fitted a new top ring after thoroughly cleaning out the piston grooves. I am running on pure petrol. I should be greatly obliged if you would tell me where my trouble lies.—R.V.L.

Possibly the trouble is due to too large a jet, which is causing overheating, and we should recommend you to try a smaller one; or it may be pre-ignition, caused by an unsuitable plug.

Failure to Start.

I am unable to start my two stroke machine from dead cold without first heating the plug. I have had the magneto to pieces and cleaned it thoroughly, but with no better results. If I heat the plug, the engine will fire with just a pull on the wheel, but otherwise nothing will induce it to start, even by running on the road. Could you give me any reason why the spark is not good enough to start unless the plug is heated? The magnets are in good condition.—O.T.S.

Heating the plug, in our opinion, would either dry up any moisture which may have collected on it, or, by reason of the heat, help the vaporisation of the fuel. Such starting difficulties as you experience are nearly always due to air leaks in the carburetter or induction pipe unions.

Purchasing Petrol.

I see in *The Motor Cycle* that one may purchase petrol after March if the amount on which the tax has been paid has not been used; but as I am not sure that it applies to my case, would you kindly make it clear to me? My licence allows me thirty gallons at not more than six gallons a month. My purchase has been as follows: November, two gallons; December, four gallons; January, none; February, six gallons; March, six gallons; total, eighteen gallons. May I go on purchasing the remaining twelve gallons on which I have paid, so long as I do not purchase more than six gallons in one month? *The agent with whom I deal declines to accept this interpretation.* I wrote to the Petrol Committee on the subject, but received no answer.—G.R.

The Petrol Committee, in issuing forms for further licences, distinctly states that present licences are still available until the amount mentioned thereon has been purchased. Your agent is in error.

DELAYS IN POSTAL DELIVERIES.

In view of depleted staffs, the curtailment of railway services, and the consequent delay in delivery of mails, readers will greatly assist by forwarding communications (including advertisements) as much as possible in advance of the dates of the issues for which they are intended.

The Order of Firing.

(1.) In what order do the cylinders fire in my 1912 5 h.p. F.N.? (2.) I notice in the distributer there are no marks as to which terminals the h.t. wires should be attached. (3.) I should like an explanation as to what the effect would be if the wires were wrongly attached from these to the plugs.—G.J.R.

(1.) The order of firing is 1, 3, 4, 2, No. 1 cylinder being at the back. (2.) The length of wires tells you the correct terminals to which the wires should be attached. (3.) If the wires are wrongly attached the spark will occur when there is no gas in the cylinder, and consequently the engine will not fire at all.

Balancing.

I have a single geared 1912 3½ h.p. ——, an excellent machine in every respect except as regards engine balance. At medium speeds (20 to 25 m.p.h.) it is fairly passable, but at 40 m.p.h the vibration is unbearable. I may say that there is no play in the engine shaft or bearings, as a new crank pin was fitted and the connecting rod re bushed late in 1916, also a new piston and rings. The latter are the same weight as the original piston and rings, and weigh 1 lb. 11 oz. I recently wrote to the makers asking them if this was correct, as they state in their booklet that their 3½ h.p. piston and rings weigh 1½ lb. To this they replied that several alterations in detail had been made since 1912, and my piston weight was no doubt correct. If the piston is held lightly it forces the crank pin down very forcibly. I rather fancy that the previous owner (I got the machine in 1915) had fitted a later date pair of flywheels and retained the old piston, throwing the whole out of balance. Can you suggest a remedy? I may add that the cylinder has been lapped out, so that the standard piston is now no use.—A.E.W.

All engines have a "period" at which the vibration is at its maximum. Yours appears to be at 40 m.p.h. Now, by skilful alteration of the balancing you can alter this "period" to any speed within certain limits; that is to say, you can have the vibration put back to, say, 27-30 m.p.h., or it might be possible to raise the "period" to, say, 50 m.p.h The matter is one which should only be carried out by a first-class engineer.

Modernising an Ancient Model.

(1.) Can a Douglas 1912 or later engine be fitted into a 1910 frame without alterations? (2.) In case of trouble with the authorities, would the compression of an engine count as a brake? I have only a back foot brake, and wish to know if the law requires a front brake. (3.) What harm is there in having the contact breaker gap in the magneto *very* wide?—B.W.

(1.) No; we fear that the later pattern engine would be too long. (2.) No; the compression would not count as an extra brake. The law does not require a front brake, but requires two independent brakes, not specifying where they should be fitted. (3.) The fact of having the break of the platinum points very wide advances the ignition, but otherwise does no harm except perhaps to increase the strain on the contact breaker parts and to alter the ignition point relative to the maximum position of armature.

Adjusting a Clutch.

My machine is fitted with a two-speed Jardine gear box, clutch, and kick starter; the kick starter has given me a lot of trouble. Whenever pressure is applied to the kick start lever, the lever just drops down with a curious grating sound as if the ratchets were over-riding one another, although there are no signs of that on the face of the teeth. Could you tell me how to eliminate clutch slip? There is a small adjusting screw on the end of the clutch plate cover. Should this screw be turned out or in?—W.S.M.

Possibly the kick starter is gummed up with heavy oil. Wash it out with paraffin, and re-oil it with cycle lubricating oil. The screw should be screwed in until it just touches the operating rod, and then turned back a quarter of a turn. If you still get slipping, the tension of the spring must be increased by screwing up the retaining nuts, having first removed the end caps.

Petrol Consumption.

My machine is a 6 h.p. Matchless-Jap, fitted with a 1914 Amac carburetter. I find my engine rather extravagant in petrol. I am using a 26 jet, which I think is fairly small for a twin. I am in doubt about the petrol level. (Being used to another carburetter until recently, I do not understand lowering the level in an Amac.) Would you kindly inform me on this point? I may say that the machine starts up very well and runs well, but I cannot get more than between 40 and 45 m.p.g. —St.J.E.E.

The level in the Amac carburetter is set by the makers, and is not likely to go wrong. The level can easily be lowered by placing a fibre or cork washer under the clip above the float, or raised by placing a copper or lead washer above the clip. This is better than attempting to alter the collar on the needle, because, in the first place, it is easier, and in the second the original level can be resumed in a moment, and both operations can be carried out without dismantling the carburetter. The jet is not too large for a 6 h.p. twin, but your consumption is certainly excessive. We should be inclined to suspect a leakage somewhere. If you mix a little paraffin with your petrol you will soon find this, if it exists.

Changing Gear.

I have a 1913-14 4 h.p. combination which (1) is very hard to start by means of the kick starter. Please tell me how to remedy this. (2.) Also, in changing gear (Armstrong three-speed hub), is it advisable to lift the exhaust at all, or is it best not to?—R.B.

(1.) The matter is one clearly of adjustment. Evidently the carburetter is admitting too much air at slow speeds. Either restrict the air supply or use a slightly larger jet. There may be air leaks in the carburetter slides or inlet pipe unions. (2.) Yes, it is best to lift the exhaust valve when changing up, but a downward change can easily be effected without doing so.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

Engine Vibration.

I should be glad of your advice on the following: I have been suffering considerably from vibration on my 3½ h.p. single. As I have only just bought the machine, I decided to take it down to see if it wanted rebushing, but to my surprise there is practically no up and down play in either end of the connecting rod, so that the original owner's statement about it having been recently rebushed must be correct. The gudgeon pin is a nice tight fit; there is practically no carbon deposit, and everything seems in good order. The timing is as follows: Exhaust closes top of dead centre; inlet opens immediately afterwards. The points of the magneto are just about to break when the piston is at the top of the compression stroke, with the spark lever two-thirds retarded. (1.) Can you suggest any better timing which would remedy the bad vibration? On inspecting the crank case I find there is no oil at the bottom at all. I have been oiling about one pumpful every ten miles, as per instructions. (2.) When reassembling the engine, how much oil should be put in the crank case? (3.) I have been running entirely on substitute, using a two-lever B. and B. carburetter with 34 jet. I seem to get most vibration when the air lever is fully open. What is the cause of this?—W.G.W.

(1.) The timing seems to be absolutely correct. It looks as if you ought to be oiling rather more frequently. (2.) After reassembling the engine, inject three pumpfuls of oil into the crank case. (3.) The trouble is probably due to the engine being incorrectly balanced, and this is perhaps accentuated when, owing to getting the correct mixture, the engine turns over rather faster. See article on "Balancing" in "Motor Cycles and How to Manage Them."

Lack of Power.

I own a 1913 T.T. single, and whatever I do I cannot get the engine to give enough power. Even on hills, which should be ascended on top, I have to drop into low gear, and then barely get up. There is no konking, only a gradual dying away of power. I have overhauled the engine, and have corrected the valve and magneto timing, but all to no purpose. (1.) The jet seems to me to be much too large. Will this affect the power? I can only get about 38 m.p.g. (2.) Will stronger valve springs make any difference? Any suggestions from you will be welcome. —R.G.H.

(1.) Too large a jet, unless excessively large, would not affect the power but the consumption. Of course, the consumption is absolutely abnormal, and you should get over double the mileage per gallon. (2.) Stronger valve springs, if they are not too strong, will certainly improve matters. You have to overhaul the engine carefully, and see that all worn parts are replaced, that the compression is good, that the valves are seating properly, and that the tappets are allowing the valves to lift to their fullest extent.

EXPERIENCES WANTED.

"J.T." (Glasgow).—Petrol consumption of 1915 4½ h.p. B.S.A.

"S.B." (Edinburgh).—Binks three-jet carburetter fitted to a 3 h.p. Enfield.

RECOMMENDED ROUTES.

PETERBOROUGH TO BRISTOL.—W.J.W.

Peterborough, Elton, Oundle, Thrapston, Wellingborough, Northampton, Towcester, Brackley, Aynho, Deddington, Chipping Norton, Burford, Cirencester, Tetbury, Cross Hands, Bristol.

MONMOUTH TO LIVERPOOL.—A.F.H.

Monmouth, Hereford, Leominster, Ludlow, Craven Arms, Church Stretton, Shrewsbury, Ellesmere, Wrexham, Chester, Birkenhead, Liverpool.

LEYLAND TO EXETER.—W.J.

Leyland, Wigan, Ashton-in-Makerfield, Warrington, Tarporley, Whitchurch, Hodnet, Wellington, Bridgnorth, Kidderminster, Worcester, Gloucester, Stroud, Nailsworth, Bath, Marksbury, Chewton Mendip, Wells, Glastonbury, Durston, Taunton, Wellington, Cullompton, Exeter.

LONDON (PADDINGTON) TO HUNSTANTON. —J.H.

Paddington, Hampstead, Barnet, Potters Bar, Essendon, Hertford, High Cross, Braughing, Barkway, Barley, at the Coach and Horses Inn turn right for Newmarket, Brandon, Methwold, Stoke Ferry, Stradsett, King's Lynn, Hunstanton.

Helping Britain to keep her end up

ALL users of motor tyres can help to "keep Britain's end up," by supporting her *internal* activities. The motor tyre industry is essentially British in origin, and the British tyre industry is in a position to supply every need—government, commercial and civil. By purchasing only British tyres you serve two distinct purposes which will enable Britain to "keep her end up.":—

1. You help to retain British gold *within* Britain.
2. You ease the food problem by reducing the shipping space utilized for the import of unneeded tyres.

Remember, not all tyres with British-sounding names are British, but the subjoined list, although not complete, affords you a choice of sixteen all-British products.

ALMAGAM	DUNLOP	MOSELEY
AVON	HENLEY	PALMER
BATES	KEMPSHALL	SPENCER-MOULTON
BELDAM	LEYLAND	ST. HELEN'S
NORTH BRITISH	MACINTOSH	WOOD-MILNE
CLINCHER	MIDLAND	

I SUBMIT there

is a solid reason why you should adopt a

BINKS CARBURETTER, viz.:

YOU CUT YOUR FUEL BILL IN TWO

if you adopt my system and use my fuel. You can, of course, use petrol or benzol without alteration.

Price of Carburetter complete—

49/-

plus 10% extra war cost.

Fit any Machine

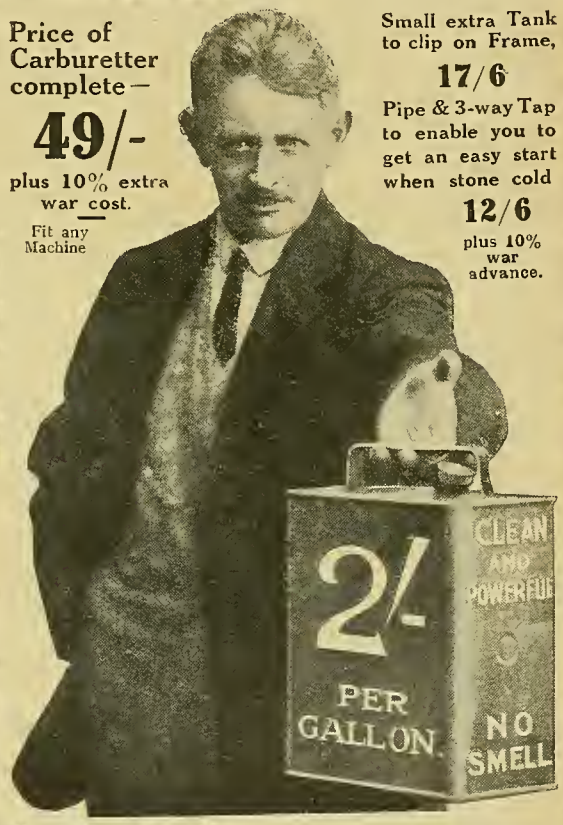
Small extra Tank to clip on Frame,

17/6

Pipe & 3-way Tap to enable you to get an easy start when stone cold

12/6

plus 10% war advance.



READ!

MY 3-PHASE JET DAMPING CARBURETTERS

have such perfect vaporising properties that they enable you to use fuel at **2/-** per gallon in 42-gallon casks, which you are allowed to keep on your premises. Casks **12/6** extra, returnable at **10/-** each, less ½d. per gallon rebate to users of the "Binks" Carburetters purchased within the last two years. Your engine will tick over dead slow, and pull dead slow in traffic, yet give the full power. It is almost impossible to tell you are not running on petrol at **3/-** a gallon. It cannot damage your engine or soot it up and makes Motor Cycling possible in these times.

I give you my personal assurance of the truth of what is stated above. Please send at once for full particulars of the carburetter, and also for my Treatise on Carburation, and terms of One Month's Approval Trial.

Agents for London:
Messrs. OYLERS, LIMITED,
35, New Cavendish Street, W

C. BINKS, Ltd., Eccles.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

2¾h.p. A.J.S., 1916 model; 50 gns.—Wauchope's, 9, Shoe Lane, London. [1704

A.J.S., 2¾h.p., 2-speed gear, lamps, horn, etc.; £20.—Bacon, Wellington, Salop. [X9176

A.J.S. Spares; prompt delivery — Cyril Williams, Chapel Ash Depot, Wolverhampton. [1253

1914 6h.p. A.J.S. Combination, 3 speeds, etc., fine condition; 58 gns.—30, Talbot St., Burnley. [X9209

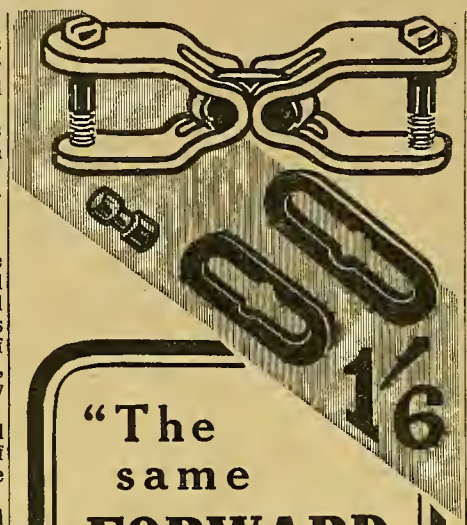
1916 4h.p. A.J.S., 3-speed, kick start, condition as new, Lucas lamps and horn, complete.—Pickering, Mirdol, Shrewsbury. [X9219

1914 A.J.S. 6h.p. Combination, good condition; sell or exchange with cash for 1916 combination, Sunbeam preferred.—Apply, J. Canty, Crockey Hill, Swanley, Kent. [1610

1914 A.J.S., 3½h.p., 3-speed, kick start, clutch, overhauled recently by makers, in very good condition; £34.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551

1916 4h.p. A.J.S. Twin, 3-speed, latest model, 2 lamps, horn, could be sold as new, run a few miles only, splendid condition; £72.—Robinson's Garage, Green St., Cambridge. [1755

6h.p. A.J.S. Combination, complete with lamps, horn, and spare wheel; sidecar De Luxe, with wind screen and storm apron, only run 50 miles; £100, no offers.—Wood, Raisthorpe, Malton. [X9163



"The same **FORWARD FASTENER** still in use" —after nine months' strenuous Active Service.

That's a point in Pte. Sheard's experiences (reported in "The Motor Cycle," April 5th) which further emphasizes the strength and entire dependability of the Forward Fastener, and establishes beyond question its claim to be

The Fastener that never fails—the strongest on the market.

Ask us or your Agent for full particulars.

FORWARD MOTOR CO.,
35, Forward Works, Summer Row,
BIRMINGHAM.

IGNITION.

THE Motoring Season has commenced, so also has the "breakdown season" through faulty Magnetos. Obviate the latter and make the former a success. Get in touch with us right away. Our service is right and charges moderate. Our customers call us experts where Magneto, General Repairs, and Lighting is concerned. Call in our aid—you'll be glad.

WM. MOORE & CO., 14, Cannon Street, Manchester.
'Phone: 2848 City.

Photography and FOCUS
Every Wednesday. Twopence.

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Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

ALLON, 1916, 2¾h.p., splendid condition, good hill-climber, fast; bargain, £26.—Ardmay, Avenue Elmers, Surbiton. [1684

ALLDAYS Allons are actually in stock at Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N.22. Deferred terms, exchanges. [1738

RUNS on Paraffin.—Allon de Luxe, 1917, spring frame, 2-speed, clutch, kick start, mileage 400; cost £52, 42 gns.—Troward's, 78, High St., Hampstead. [1491

ALLDAYS Matchless, 1915, 4h.p., countershaft 3-speed, clutch, lamps, horn, footboards, splendid machine; bargain, 41 gns.; lightweight wanted.—Newnham, 223, Hammersmith Rd., W.6. 'Phone: 80. [1748

Ariel.

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

1915 3½h.p. Ariel, 3 speeds countershaft, splendid condition throughout, certain quantity of petrol; £37/10.—Henly, 8, Woburn Place, W.C.1. [1775

ARIEL, 3½h.p., 3-speed countershaft, new June, 1915, in fine condition, with or without Rover coach sidecar; must dispose.—Williams, Gladstone House, Stornoway. [X9105

ARIEL, the reliable motor cycle, 3½h.p. single, and 5-6h.p. twin models; delivery from stock.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0889

ARIEL, 2½h.p., mag., Amac, footboards, horn, pump, good tyres and tubes, enamelled, overhauled, nice mount; first £12 gets it.—Wright, Constabulary, South Normanton, Derbyshire. [1732

ARIEL, 1916, 3½h.p., 3-speed countershaft, with sidecar, speedometer, 3 lamps, Stewart warner, luggage grid, perfect condition, real bargain, £55; also 1917 new model solo, £72/10; deferred payments, exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [1741

Auto Wheels

GENUINE Wall Auto-Wheel, complete, new condition, splendid running order; £8/10.—Murray, 37a, Charles St., Hatton Garden, Holborn. [X9216

Bat.

RUNS on Paraffin.—1912 Bat-Jap, 5-6h.p., 2-speed clutch, spring frame, perfect; 18 gns.; with 1915 underslung coach sidecar 25 gns.—Troward's, 78, High St., Hampstead. [1479

1915 6-8h.p. Bat-Jap (new 1916), 3-speed countershaft, kick start, coachbuilt sidecar, splendid condition; £48, lowest.—Lieut. Birkbeck, M.C., Potteries, Queenborough, Kent. [X9164

Bradbury.

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage; £49/10.—Motor Exchange, Horton St., Halifax. [1455

BRADBURY 1914 Combination, 4h.p., N.S.U. 2 speeds, in good condition.—53, Denmark Hill, Camberwell. [1654

4h.p. Bradbury, just been overhauled, re-enamelled, and plated, a very nice motor; £20.—Walbrn Cycle Co., Saffron Walden. [X9127

BRADBURY, 1913, 4h.p., 2-speed N.S.U. gear, with Montgomery wicker sidecar; £18.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491

MOTOR CYCLES FOR SALE.

Bradbury.

BRADBURY, 3½h.p., 1913, Tourist Trophy Model, Seuspray carburetter, watertight mag., machine in perfect condition throughout; for quick sale, bargain, £13/10.—Mebes and Mebes, 156, Gt. Portland St., W. [1443

BRADBURY, 1913-14, 4h.p., N.S.U. 2-speed gears, free engine, Bosch dustproof mag., Canoelet coach-built sidecar, lamps, speedometer, mechanical horn, splendid condition; £37.—Ford, 42, Clifton Rd., Old Kent Rd. Station. [1602

Brough.

BROUGH, 1915, 3½h.p., 2-speed, done 2,000 miles, as new, all accessories; £45. Delamare, c/o Finson, 6, High St., Ascot, Berks. [1603

B.S.A.

B.S.A., new 1917 models H and K actually in stock. —Moss, Wem. [X9027

COLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

NEW 1917 B.S.A., in stock, £64; Millford sidecar, 15 gns.—Cross, Motor Agent, Rotherham. [X9170

B.S.A. 1917 H and K Models in stock for immediate delivery; exchanges entertained.—Eagles and Co., High St., Acton, London. [X9182

B.S.A., 1916 Model H, actual mileage 1,300, speedometer, lamps, horn, tools, perfect in every detail; £57/10.—21, Alpe St., Ipswich. [1655

B.S.A. 1912 Free Engine Model, T.T. handle-bars, excellent condition, new appearance; £26.—Eagles and Co., High St., Acton, London. [X9185

RUNS on Paraffin.—1915-16 B.S.A., 3-speed countershaft, coach sidecar, run under 4,000 miles; 53 gns.—Troward's, 78, High St., Hampstead. [1487

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert L. Pitts, Bedditch. Tel.: 91. [X0529

B.S.A., 4¼h.p., 1914 model, 3-speed countershaft, Klaxon, lamp, tools, tyres perfect; owner France; £37.—Hammond, The Firs, Romford, Essex. [X8946

B.S.A. 4¼h.p. Model K, late 1915, 3-speed countershaft gear, with Millford coachbuilt sidecar, fine condition; £57.—Eagles and Co., High St., Acton, London. [X9183

B.S.A. 1912-13 Free Engine Model, Dunlop heavy tyres (unscratched), N.S.U. 2-speed gear, with adjustable pulley, accessories; £30.—Eagles and Co., High St., Acton, London. [X9184

B.S.A., 1915, 4¼h.p., coachbuilt sidecar, wind screen, hood, speedometer, horn, electric head, side, tail; excellent running order and condition; £60.—48, Leeside Crescent, Golders Green, N.W.4. [1627

B.S.A., late 1916, 4¼h.p., all chain model, with 12 gn. Watsonian sidecar, 3 lamps, Stewart horn and speedometer, quite like new, £71; also 1917 all chain model, just arrived; exchanges, deferred payments.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [1740

1917 New 4¼h.p. B.S.A., Model R, 3-speed, and clutch motor cycles for immediate delivery from stock, £64; also unique selection of second-hand B.S.A. 4¼h.p. models, 1915 and 1916, at low prices to clear; extended payments arranged; special low prices for cash. —Wauchope's, B.S.A. City Agents, 9, Shoe Lane, Fleet St., London. [1712

Calthorpe

COLMORE Depots, Birmingham, Manchester and Liverpool, for Calthorpe motor cycles. [0799

2¾h.p. Calthorpe, 2-stroke, 2 speeds, very fine condition; 22 gns.—30, Talbot St., Burnley. [X9208

1915 2¾h.p. Calthorpe-Jap, 2-speed, new August, 1916; £25.—114, Palace Gates Rd., Wood Green, N.22. [X9177

CALTHORPES, J.A.P. engines, Enfield gears, £39/18, cash, easy terms, or exchange.—Wauchope's, 9, Shoe Lane, London. [1706

CALTHORPE, 2-stroke, 1917, latest model, Enfield 2-speed; 33 gns.; brand new.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [1639

CALTHORPE-J.A.P., 1917, latest model, brand new, Enfield 2-speed; in stock; 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [1637

CALTHORPE-JAP, 1916, 2-stroke, 2-speed model, £24/10; deferred terms no extra.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. 1744

CALTHORPE, 2-stroke, new, but slightly shop-soiled, Enfield 2-speed; special bargain, 27 gns.; usual price 33 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [1640

CALTHORPE-J.A.P., new, but slightly shop-soiled, Enfield 2-speed; special bargain, 31 gns.; usual price 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [1638

CALTHORPES, also 1916 Calthorpe-Jap, 2-speed, and accessories; £24/10. Get them at Lamb's; they are actually in stock; exchanges, deferred payments.—151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green. [1736

Campion.

1917 Campion, Villiers engine, 2-stroke, 2-speed, ridden only 200 miles; cost £40, speedometer; will take £28.—Major Hodgson, Hexworthy, Mannamead, Plymouth. [X9075

WE WILL BUY IT

if it's a B.S.A., Harley-Davidson, Enfield, Indian, A.J.S., Douglas, James, Rover, Calthorpe, Levis; but the condition must be right externally and internally; proof of ownership essential. Cash immediately on completion of deal. Call with Outfit, if possible.

NOW ACTUALLY ON SHOW.

HARLEY-DAVIDSON 7-9 h.p. Stan. Comb. **£115 10**
HARLEY-DAVIDSON 7-9 h.p. Comb., elec. equipment **£126 10**
HARLEY-DAVIDSON 7-9 h.p. Sporting Combination **£117 10**
B.S.A. 4¼ h.p. belt-cum-chain model **£64 0**
B.S.A. 4¼ h.p. all-chain **£66 0**
ENFIELD, 2¼ h.p., 2-speed, 2-stroke **£44 2**
ENFIELD, 6 h.p. Combination (Standard) (2-seater £3 extra). **£94 10**
LEVIS, 2¼ h.p., 2-sp., Enfield gear, rustless rims **£47 10**
LEVIS, 2¼ h.p., Popular model **£32 0**
ALLDAYS ALLON, single-speed, 2½ h.p. **£37 16**
ALLDAYS ALLON, 2-speed, 2½ h.p. **£44 2**
ALLDAYS ALLON, 2-sp., clutch, 2½ h.p. **£47 5**
CALTHORPE-J.A.P., 2¾ h.p., 2-speed **£39 18**
NEW HUDSON, 2¼ h.p., 2-speed, Model C **£38 0**
ARIEL, 3½ h.p., 3-sp., kick-start, solo mount **£72 0**
ROYAL RUBY, 2½ h.p., single-speed **£40 0**
ROYAL RUBY, 2½ h.p., 2-speed **£47 5**
ROYAL RUBY, 2½ h.p., 2-sp. J.A.P. **£46 0**
HARLEY-DAVIDSON 7-9 h.p. 1916 Comb., H.-D. bulbous back Sidecar **£105 0**

SECOND-HANDS.

JAMES, 4¼ h.p., 1915, 3-sp., kick-start, 3 lamps, horn **£57 10**
REX, 6 h.p., 1913, twin, coach Comb. **£36 10**
NEW HUDSON, 4 h.p., late 1913, and N.H. Sidecar, speedometer, windscreen **£39 10**
ROVER, 3½ h.p., 1913, Philipson pulley, 2 lamps, horn **£35 10**
T.D.C., 1916, 2½ h.p., 2-sp., original tyres, bargain **£25 0**
ROVER, 3½ h.p., dry cell ignition **£5 0**
ARIEL, 3½ h.p., 3-sp., c/shaft, k/start, and Ariel Sidecar, 3 lamps, Stewart warner, luggage grid **£45 0**
P. & M., 3½ h.p., 1913, 2-sp. gear, all access. **£33 10**
JUNO-VILLIERS, 2½ h.p., 1916, all access., mileage about 100 **£30 10**
ALLDAYS ALLON, 2½ h.p., 2-sp., 1915, single-speed and access. **£25 0**
AUTO-WHEEL, 1 h.p., Standard model, £6 10s.; **B.S.A.** model **12 gns.**
RADCO, 1914, single-speed **£16 10**
O.K.-JUNIOR, 1916, 2½ h.p., 2-sp., only shop-soiled, and access. **£28 10**
CALTHORPE-J.A.P., 2¾ h.p., 1915, 2-sp., all accessories **£24 10**
B.S.A., 3-sp., Model H, 4¼ h.p., ridden only 800 miles, speedometer, Lucas lamp, Stewart horn, new Watsonian Sidecar **£71 0**
LINCOLN-ELK, 1913, 2-speed, kick-start, with lamp, horn; new order **£24 10**
DOUGLAS, July, 1915, 2-sp., kick-start, lamp, horn, original tyres, ridden approx. 2,000 miles **£45 0**
ENFIELD, 2 Box Carriers, each **£15 15**

SIDECARS.

Indian Canoelet, suit 5 h.p. machine **£15 15**
Watsonian, all models in stock, from £9 2s. 6d. to **£14 14**
Phœnix Standard Sidecar, coach **£7 10**
Phœnix Wicker Sidecar, cigar-shape, little used **£6 10**
1 Coach Sidecar, green finish **£7 7**

DEFERRED PAYMENTS by mutual arrangement.
EXCHANGES.—Highest allowances made on up-to-date Solo Mounts or Sidecar Combinations, in part exchange for new.
PEDAL CYCLE DEPT.—Bike it, and keep smiling. We have a splendid assortment of 150 machines of best makes, from £6 10s. to £14 14s.

LAMB'S,

151, HIGH ST., WALTHAMSTOW, E.17.
Phone: Walthamstow 169.
5 minutes Hoe St. (G.E.R.)

And 50, HIGH RD., WOOD GREEN, N.22.
(Only depot in this district).
'Phone: Hornsey 1956.
Hours—9 to 8-30.
Thursdays, 1 o'clock.

MOTOR CYCLES FOR SALE.

Chater-Lea.

2½h.p. Chater-Lea, 1916, 2-speed, 2-stroke, just overhauled, 100 m.p.g. of paraffin; £30.—Taylor, Brookhouse, near Rotherham. [X9167

Chater-Lea-Jap.

8h.p. Chater-Lea-Jap, 1916 model, 3-speed countershaft gear, and free engine plate clutch, handle starting, fitted with coachbuilt tandem seated sidecar, Pillion seat on back carrier, an ideal 4-seater combination, complete with all accessories, condition as good as new, includes screen, storm apron, not ridden above 500 miles; 75 gns.; guaranteed.—Wauchope's, 9, Shoe Lane, Fleet St., London. [1711

Chater-Minerva.

CHATER-MINERVA 5h.p. Twin Racer; 12 gns.—E. May, Greyhound Lane, S.W.16. [1605

Clyno.

CLYNO 1912 6h.p. Combination; £35/10.—Motor Exchange, Horton St., Halifax. [1457

2¾h.p. Clyno, 2-stroke, 2-speed; £22/10; guaranteed.—Wauchope's, 9, Shoe Lane, London. [1707

1917 New Clyno Combination, with spare wheel and luggage grid, splendid turnout; price right.—Potter, Leicester Grove, Leeds. [X9222

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

6h.p. Clyno Combination, 3-speed countershaft, magnificent turnout, had little use, 70 m.p.g., guaranteed, detachable wheels; sacrifice £52; take fast solo machine part.—Else, Dimple, Matlock. [X9211

CLYNO 1917 War Office Combination, done 200 miles, complete with Lucas head, rear, and sidecar lamps, Lucas horn, Dunlop tyre on spare wheel; cash offers wanted; Birmingham district.—Box L3,530, c/o *The Motor Cycle.* [1784

1916 Clyno Combination, War Office Model, detachable wheels, spare wheel, 6h.p., only ridden 1,000 miles; cost £130; car tyre on back, 2 spare chains, all accessories, purchased November, guaranteed perfect; 90 gns.—Page, 169, Koox Rd., Wellingborough. [X9196

Coventry Eagle.

COVENTRY Eagle 1916 Twin, sidecar combination, 3-speed countershaft; £69/10, or exchange for Morgan.—Holdsworth, 22, Belvoir Gardens, Halifax. [1456

Diamond.

1916 2¾h.p. Diamond, Villiers power unit, 2-speed countershaft, chain drive, accessories; 25 gns.—Sgt. Morgan, 1st London General Hospital, Myatts Park, Camberwell. [1622

Douglas.

DOUGLAS, 1915½, 2¾h.p., T.T., like new; £40.—29, St. Leonard's St., Bow. [1723

1917.—Gibb, Douglas Expert, Gloucester, for earliest deliveries of The Motor Cycle. [X8510

DOUGLAS, 1914, 2-speed, splendid condition; £34.—Passey, St. Albans Rd., Watford. [1680

1912 2¾h.p. Douglas, 2-speed, engine and condition exceptionally good; £21.—30, High St., Taunton. [1731

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Yeovil. Tel.: 50. [5855

DOUGLAS, 1915¾, 4h.p., 3-speed, coachbuilt sidecar, excellent condition; £65.—Kinder, 51, North Parade, Grantham. [X9135

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

DOUGLAS, 2¾h.p., 2-speed, 1912-13, real good machine, runs perfectly; 22 gns.—245, Hammersmith Rd., London, W. [1697

2¾h.p. Douglas, 1915 W.D. Model, T.T. bars, 2-speed gear, excellent condition; £42; guaranteed.—Wauchope's, 9, Shoe Lane, London. [1705

2¾h.p. Douglas, T.T. Model, 2-speed, fast, and in good condition, enamelled Indian red and black; price £33.—Bollard, Ashby-de-la-Zouch. [X9139

DOUGLAS, 2¾h.p., 1912-13, 2-speed, special condition, absolutely sound, lamps, etc.; 22 gns.—Lionel Kington, 245, Hammersmith Rd., London, W. [1607

1915 Douglas, T.T., hand and foot clutch, 2-speed, kick starter, speedometer, Lucas, all accessories, practically new; nearest £40.—137, Roding Rd., Homerton. [1663

DOUGLAS, 1912 (late), 2¾h.p., T.T., 2 speeds, lamps tools, horn, spares, and overalls, splendid condition, running order; £25.—Webster, Victoria Hotel, Surbiton. [1725

1915½ T.T. Douglas, 2-speed, 2¾h.p. Colonial Model, P. and H., Dunlop, Lucas horn, knee-grips, little used, grand condition; £45.—89, Durlston Rd., Upper Clapton, N.E. [1690

1915 2¾h.p. Douglas, 2-speed, semi T.T. bars, 2 Lucas lamp sets, Watford speedometer, horn, etc., in perfect mechanical order; £50.—Robinson's, Garage, Green St., Cambridge. [1754

DOUGLAS, 1913, 2¾h.p., 2-speed, tyres nearly new, P. and H. head lamp and generator, rear lamp, horn, spare belt and tube case; £27/15.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [1643

MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS, 1915, 2¾h.p., 3-speed, and free engine, countershift gear, had little use, condition perfect; £45, or exchange late 3½h.p. single or twin, 3-speed. solo or coachbuilt combination.—Withers, 60, Orchard St., Weston-super-Mare. [X9031

DOUGLAS, 1916, 2¾h.p., 2 speeds, all tools and accessories, in perifect order, £45; new Pillion seat and Dunlop belt, £1; shed in sections to bult, £5; or £50 for the lot; appointment to Horder, 93, Norbury Crescent, Norbury, S.W.16. [X9110

2¾h.p. Douglas, latest models, including W, clutch, kick start, U tuning, V racing; special arrangements to supply doctors and farmers immediately against Minister Munitions certificate. Full particulars and how to obtain them, Robinson's Garage, Green St., Cambridge. [1757

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fullowfield, Manchester. [8012

EDMUND-J.A.P., 2½h.p., 2 speeds, the wunderful spring frame machine. We can deliver from stock; price 50 gns.; detailed list free.—The North Wales Motor Exchange, Holt St., Wrexham. [X8755

Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2¼h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

ENFIELD 1916 6h.p. Combination, new condition; 70 gns.—29, St. Leonard's St., Bow. [1722

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

ENFIELD 1915 6h.p. Combination, only done 600 miles; £63.—Passey, St. Albans Rd., Watford. [1681

ENFIELD Combination, 1916, elaborately fitted; £65. —51, Mapletborpe Rd., Thornton Heath, S.E. [1714

ENFIELD, 1917, 3h.p.; 55 gns.; brand new.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [1635

ENFIELD 1916 6h.p. Combination; a bargain, £67/10.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [1633

ENFIELD 2-speed Twin Lightweight, electric lights; £25, or exchange good 2-stroke.—5, Rainham Rd., Willesden, N.W.10. [1669

ENFIELD 1917 6h.p. Combination; 90 gns.; brand new.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [1634

ENFIELD 3½h.p. Twin, 1916, new condition, run 300 miles; £40.—Capt. Gaskell, Military Hospital, Western Heights, Dover. [1773

1916 3h.p. Enfield, T.T. bars, very fast, as new, lamps and horn, complete; £50; 3 weeks only.—Harker, Shoreham, Sussex. [1766

1917 Model 3h.p. Enfield and sidecar, not ridden 100, as new; £49; 6h.p. combination wanted; exchange.—Grimshaw, High St., Bolton. [1601

1913-14 Enfield Combination, coach sidecar, £49/10; 1912 Enfield combination, cane sidecar, £39/10 —Motor Exchange, Horton St., Halifax. [1458

ROYAL Enfield Combination for sale, late 1914, condition as new, spares, 6 tins petrol; any trial; £56.—F. Ward, 87, Durham Rd., London, N.7. [1619

6h.p. Royal Enfield Combination, fitted with Lucas dynamo lighting set, hood and screen; £87/10; trial given.—Wauchope's, 9, Shoe Lane, London. [1708

ENFIELD 1913 6h.p. Cumbination, in very good order, lamps, Stewart horn, and complete equipment; £40.—T. Parsonage, Sweetbriar Hall, Nantwich. [X9193

ENFIELD Combination, 6h.p., 1913, owner driven, fully equipped, perfect running, new tyres; selling because of war; £50.—Wild, Lungford, Middlesex. [1434

ENFIELD, 1917, 2-stroke, £44/2, brand new. We are Enfield specialists; immediate delivery; all models in stock.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [1636

ENFIELD, 1917, 2-stroke, 2½h.p.,, speedometer, lamps, horn, 2-speed, free engine, 120 m.p.g., hardly soiled, go anywhere; £38/10.—Garaged Rawleyne Arms, Lenge. [1787

ENFIELD, 1916, 2h.p., 2-speed, lamps, horn, speedometer, etc., and Canoelet Minor sidecar, good condition; £57.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

ENFIELD 6h.p. Combination, £94/10; also 2¼h.p. 2-speed lightweight, £44/2; deferred payments if desired.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [1743

6h.p. Enfield Special Combination, hood, screen, speedometer, accessories, mileage 7,100, perfect; 48 gns.; petrol, any trial, licence.—Mrs. Williams, Hazelcourt, Seafield Rd., Hove. [1793

ENFIELD Combination, 1916, 6h.p., kick starter, runs on substitute, Gloria horn, acetylene lamps, handle-bar mirror, watch, muffs, Pillion seat, child's seat in sidecar, tyres and condition excellent, used week-ends; £75.—Brammall, 12, Ryde Vale Rd., Balham, S.W.12. [X9205

SIDECAR OUTFITS.

CLYNO, 6 h.p., 3-speed, with coach-built Sidecar £65

HARLEY-DAVIDSON, 1916, 7-9 h.p., coach-built Sidecar £80

ZENITH, 1914, 8 h.p., with Sidecar £57

ZENITH, 1915, 3½ h.p., with coach-built sidecar £45

TRIUMPH, 1911, 3½ h.p., with wicker Sidecar £30

SINGER, 1913, 4½ h.p., with basket Sidecar..... £33

RUDGE-MULTI, 1914, 3½ h.p., with coach-built Sidecar..... £30

SCOTT, 1914, 3¾ h.p., with Myers Sidecar..... £47

J.H., 1916, 8 h.p., 3-speed, Millford Sidecar £65

Fullest particulars of these or Solo Machines post free upon request.

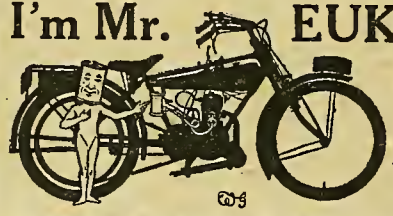
MAUDES MOTOR MART

100 & 136 Gt Portland St. London W.

Telephone 552 Mayfair *Telegrams* Abdicate Wesdo

D'YOU KNOW ME?

I'm Mr. EUK



The genius of Easy Starting for Motor Cycles. They say I shall become famous. I offer my help to banish starting difficulties for all riders who give me a place on their machines. I am small in size, little in weight, I occupy only tiny space, but, whenever you want to start, I give you a big push off with immense power that makes your starting instant, sure, and easy. Let me ride with you. That's my place on the machine, right there inside that little fitment which is called THE

EUK EASY STARTER

The greatest starting improvement. Can be fitted to any machine in ten minutes. Only a touch and it forces a fine highly-atomised Petrol Gas Vapour direct to the induction tube, where it forms a rich explosive mixture, giving absolutely instantaneous easy starting. COSTS **21/-.** Never fails. Over 33,000 in use. You ought to know about it. Write now for details.

ALEXANDERS

Dept. B, 113-115, Lothian Rd., EDINBURGH.

MOTOR CYCLES FOR SALE.

Excelsior.

RUNS on Paraffin.—1917 British Excelsior, 2-speed, clutch, 2-stroke, run 400 miles; 28 gns.—Troward's, 78, High St., Hampstead. [1478

7-9h.p. New Excelsior, 1916 model, beautiful machine; immediate delivery.—Connaught Motor and Carriage Co., Ltd., 28, Long Acre, W.C.2. Tel.: Regent 6440. [1664

Gamage.

GAMAGE 2¼h.p. Motor Cycle, running order, all accessories; £10; approval.—Rose, Wicklewood, Norfolk. [X9159

Grandex.

RUNS on Paraffin.—Brand new 1917 Grandex-Villiers, 2-speed, 2-stroke; list 38 gns., to clear 28 gns.—Troward's, 78, High St., Hampstead. [1480

Harley-Davidson.

J. A. STACEY, 12, Ecclesall Rd., Sheffield, for 1917 Harley-Davidsons, delivery from stock. [9577

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802

LATE 1915 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0861

1915 7-9h.p. Harley-Davidson, and Phœnix sidecar, 3-speed gear, lamp, horn, etc., perfect condition; £58, or nearest offer.—Gough, 86, Alexandra Rd., Aldershot. [1716

HARLEY-DAVIDSON Combination, Oct., 1915, Stewart speedometer, mechanical horn, mirror, used only week-ends, splendid condition; £63.—Wybrow, 144a, Loughborough Park, Brixton. [1691

HARLEY-DAVIDSONS.—Immediate delivery; new magneto models, £84/15; several second-hand 1915 and 1916 combinations from £65; exchanges arranged. —Colmore Depots, 31, Renshaw St., Liverpool, and 211, Deansgate, Manchester. [0885

7-9h.p. Harley-Davidson 1916 Combination, complete with all accessories, 3-speed gear and free engine, specially good combination, and in condition like new, includes all accessories; 80 gns.; guaranteed.—Wauchope's, 9, Shoe Lane, London. [1700

7-9h.p. Harley-Davidson, late 1915, with 1916 improvements, and Gloria sidecar, electric light and horn, also pneumatic horn, speedometer, very little used, tyres in splendid condition; owner fighting; £70, a bargain.—C. Wigg, 31, Bow St., W.C.2. Tel.: 1040 Gerrard. [1686

HARLEY-DAVIDSON Sporting Outfit actually here, with Swan torpedo sidecar, T.T. handle-bars, £117/10; also electric model, with C. sidecar, £126/10; one without electric equipment, but with B. sidecar, £115/10; 1916 plain model with bulbous back sidecar (H.D.), £105; deferred payments if desired; liberal exchanges.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [1742

Hazlewood.

RUNS on Paraffin.—1914 6h.p. Hazlewood-Jap, 3-speed clutch, kick start, countershaft drive, Bramble 16 gn. underslung coach sidecar; 42 gns.—Troward's, 78, High St., Hampstead. [1481

Humber.

1911 3½h.p. Humber; £15/10.—Motor Exchange, Horton St., Halifax. [1465

HUMBER, new 3½h.p. 1917 flat twin model, actually in stock.—Moss, Wem. [X9028

HUMBER Flat Twin Motor Cycles immediately from Colmore Depot, Birmingham. [0882

1914 3½h.p. 3-speed Humber, lamp, etc.; £35; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0863

HUMBER, 1917, 4h.p., flat twin, and sidecar; £75, or exchange.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [1452

2¾h.p. Twin Humber, 3-speed, free engine, new tyres, engine and mag., just been overhauled by makers; a bargain, £23.—Walbro Cycle Co., Saffron Walden. [X9126

HUMBER Combination, 1913, 3½h.p., 2 speeds, handle starter, lamps, generator, horn, accessories, nearly new tyres, splendid order throughout; £30; please call.—43, Mortimer Rd., Kensal Rise. [1685

Indian.

1915 7-9h.p. Indian Combination, complete, lamps, etc., fine order; £70.—Cross, Jeweller, Rotherham. [X9168

1916 7h.p. Indian Combination, electric lighting, spring frame, 3 speeds, splendid condition.—30, Talbot St., Burnley. [X9210

1915 7-9h.p. Indian, clutch model, in new condition, lamps, speedometer, etc.; £37/10.—Oram, Colin Park, The Hyde, Hendon. [1678

1914 7h.p. Indian and Sidecar, 2-speed, in splendid condition; bargain, £38.—Pittuck, Railway Station House, East Ham. [1593

1914 Indian, 7h.p., spring frame, 2 speeds, clutch, kick start, as new throughout; £36.—Winter, 14, Connaught Av., East Sheen, S.W.14. [1609

1915 7-9h.p. Indian, 3 speeds, kick starter, spring frame, T.T. bars, electrically equipped, speedometer; £49.—18, Ranelagh Av., Barnes. [1726

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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South Africa—Central News Agency, Ltd. Paris—Smith's English Library, 248 Rue Rivoli.

The Sidecar de Luxe.

PURSUING our policy of publishing helpful and educative articles at this period, when so much thought and hard work must be expended to maintain for England its premier place in the motor cycle world after the war, we publish an article this week on the subject of the design of the heavyweight sidecar. We hope and feel that the article will prove suggestive to the go-ahead designer who is not satisfied to mark time while there is so much prospect of competition ahead. If one excepts the important developments which have lately taken place in the matter of flat twin engines of comparatively large sizes, it must be confessed that the heavyweight sidecar outfit, as a whole, has made comparatively little progress. True it is that the detail design has been improved, and the machine rendered a good deal more reliable thereby, but the threatened competition of the cheap light car after the war compels special consideration of the heavyweight sidecar in particular. The heavy sidecar has reached such a stage of perfection that it is definitely the vehicle of thousands who could afford a small car, but, on the other hand, many consider it a makeshift, and openly assert that light cars will be theirs "when they get cheaper." For thirteen years or more—that is since its advent—"experts" have been pronouncing the doom of the sidecar, but it still manages to retain a very healthy existence, and we see no reason why it should not continue in that happy state and considerably increase and multiply, provided opportunities are seized to move with the times. Increased comfort, better protection for the working parts, a more careful study of accessibility, simplified control (in this connection it must be confessed that many sidecars with their array of levers are nowadays far more difficult to handle than a car), and, above all, better protection for the driver from mud and outside elements, would give the sidecar a new lease of life. Many who unfavourably compare the heavy sidecar to the light car seem, in the majority of cases, to consider first cost only, but this is not enough. With the sidecar the taxes are lower, tyres cheaper, insurance lower, any necessary repairs cheaper, whilst the reduced consumption of fuel and oil is of great importance in a year's mileage. The small car necessitates increased expenditure all round, and we need hardly emphasise the fact that people who can afford £75 and must have economy are far more numerous than those whose spending power may be from £100 to £125.

Petrol Allotments.

AGAIN we are reminded of the shortage of petrol by daily papers which delight in reviewing orders and threats of a drastic nature. But we get no farther. The ill-informed journals which last week announced as "new" the cessation of licences for petrol or petrol substitutes except for "business and public duties" are evidently ignorant that such action was resolved upon and announced weeks ago, and so far as we are aware is being carried into practice. If business is to be carried on, then petrol in reasonable quantities must be forthcoming. Likewise if voluntary effort which such organisations as the special motor constabulary, volunteer sections, the Red Cross services, etc., call for is to be kept up, then petrol in reasonable quantities must be maintained. As for the rest, really the average daily paper scribe would give the impression that motorists and motor cyclists *steal* the petrol they use for the little recreation they may take at week-ends. They seem to have yet to learn that motorists have been "rationed" for nine months, and the motoring that is done is permissible and officially sanctioned—if not, why issue a licence at all? If the need really exists and our Army will benefit, motor cyclists will gladly forego every drop of petrol allotted them. The matter is entirely in the hands of the Petrol Control Committee.

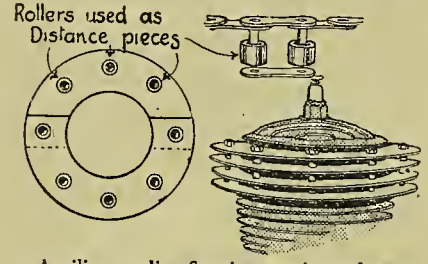
An index to the advertisements in this issue will be found on the page facing the back cover.

IDEAS: Useful and Ingenious.

Readers of "The Motor Cycle" are invited to contribute to this page any ideas successfully adapted to their motor cycles. Rough sketches will suffice.

COOLING FINS.

IF an engine is inclined to overheat, cooling fins of copper or aluminium can be made by cutting the disc in halves so arranged as to overlap. They are then fixed in place by a set of



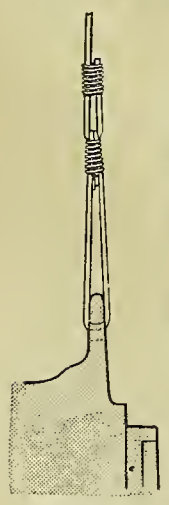
Auxiliary cooling fins, inexpensive and easy to make.

bolts, rollers of a suitable size previously removed from a driving chain being placed between the disc as distance pieces. To facilitate the cutting of the discs it is advisable first to make a cardboard pattern.—J. D. WALTER, Devonport.

MENDING SPOKES.

WHEN the spoke of a motor cycle wheel breaks the fracture is almost invariably close to the hub, and a satisfactory repair can easily be effected in the following manner:

Knock out the broken portion, and remove the whole spoke by unscrewing from the nipple. Next cut off enough of the spoke to prevent the mended part from clashing with the spoke crossings, and bend it into a loop. Next, take a piece of galvanised iron wire about 14 or 16 gauge, thread it through the hub flange, and bring both ends up to meet the spoke which has been screwed just far enough into the nipple to get a good grip on the thread. Bending the ends of the wire over at right angles, pass them through the loop already made in the spoke and grip them as close to the spoke as possible with a pair of pliers (those having parallel jaws are the best, as they will grip both wires firmly), and bend back as shown in the sketch. If the wire has been neatly bent into position the spoke will now be just taut, and, the loops having been bound with thin copper wire, the spoke can be tensioned in the usual manner by screwing up the nipple. A repair done in this way will stand a considerable amount of tension, and, so far, the writer has not known one to fail.—AURIGA.



A simple way of repairing a broken spoke.

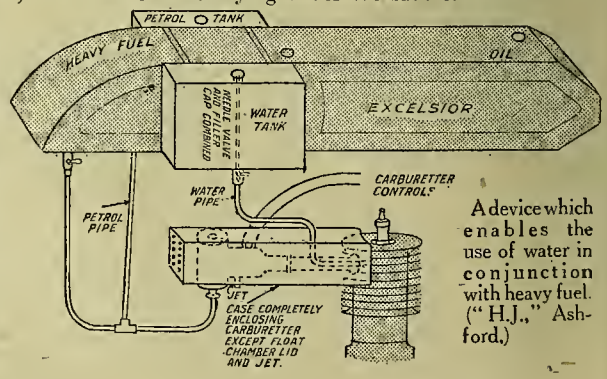
RUNNING ON PARAFFIN AND WATER.

"H. J.," Ashford, who submits the accompanying sketch and description, says he used the vaporiser and tanks quite successfully last season.

"The two small tanks, placed pannier fashion on the main tank, are 1½in. thick and hold one quart each; they also answer the purpose of knee grips. The filler cap of the water tank acts as needle valve for regulating the supply of water. The carburetter is a Senspray, and is enclosed by a tin case, all except the float chamber lid and the bottom of the jet. The case is fastened in place by the petrol pipe union, the float chamber lid screwing tightly against it. It is made scoop shape, and has ten small holes punched in the end, allowing a current of hot air from the cylinder to pass right through it, which heats the inlet pipe, the carburetter, and also acts as hot air intake. The water pipe goes through the inlet pipe into the inlet valve chest, and at the end is a jet like a petrol jet. I have had very good results with this vaporiser on pure paraffin. I start the engine on petrol, put the clutch in, and then turn the petrol off and the paraffin on. The only trouble I have had has been on very stiff hills, and then I have to turn the paraffin off and the petrol on, which I can do without dismounting.

"I have not tried the water properly yet, but it is a great advantage in hill-climbing. I can let the engine go uphill until it starts knocking; turn the water on and the knock disappears. My engine seems to run as well on paraffin and water as on pure petrol, but I have not tried it on a long run yet, as I fitted the water tank only at the end of last season. The experimenting I have done has, however, given better results than I expected.

"My machine is a 1913 British Excelsior, single-speed, 4½ h.p. combination."

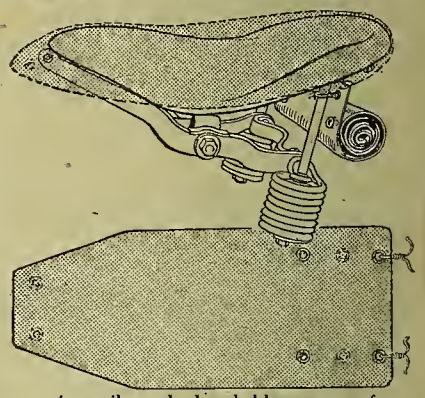


A device which enables the use of water in conjunction with heavy fuel. ("H.J.," Ashford.)

SADDLE COVER.

THE trouble of a wet saddle can be overcome in the following manner:

Take a piece of good American leather, about 3in. wider than the saddle, and 6in. to 8in. longer, and cut to shape as shown. Take three pairs of spring fasteners (those cut off gloves are best, and part of the leather cut with them makes a good basis for securing to the



An easily made detachable waterproof saddle cover.

saddle cover). Sew on at the points marked; if the outline is dotted sew the stud on the opposite side of the leather which is shown face up at AA. Attach pieces of wire (insulated bell wire with insulation still on is best); secure these wires to the upright bars of the saddle just above the springs on a Brooks 170, having the cover upside down and opened fully out behind the saddle. To cover the saddle pull over it and secure the pair of fasteners, which will grip the saddle point. When not in use pull right back, roll up tightly, and then the other pair of fasteners will meet, making a secure neat roll lying under the saddle.

Am I Too Heavy?

I HAVE not yet recovered from the bewilderment into which recent hill-climbing claims on behalf of single-geared baby two-strokes have thrown me. I have ridden all the best makes, many for considerable distances, and I must frankly admit that it is a far commoner experience with me to be stalled on a two-speed up a bad hill than to make a clean ascent of a similar grade with a single gear. In fact, as far as I remember, rushing short pitches of about 1 in 8 on a Levis Popular represents quite the limit of my single-geared hill-climbing work with these babies, and I should no more dream of putting one of them at Sunrising than I would try to sink a submarine with a shot gun. As various riders reiterate the claims which first struck my attention, I began to wonder whether I was losing my tuning ability in my old age; and I seize with avidity on a statement in Capt. Paine's letter to enquire whether all these champion hill-climbers are ridden by featherweights. Possibly my own corpulence is responsible for the importance I attach to an emergency gear before I go touring on a baby.

Judging Distances.

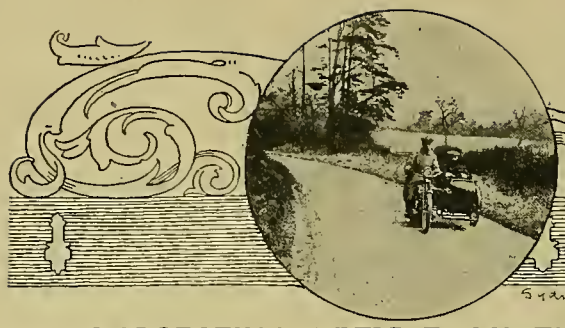
TWO of my acquaintances are one-eyed motorists, and whilst they are too shy to enter the public lists and break a lance with the optical experts, they both say that their power of judging distances is as good with one eye as ever it was with two, though the faculty of judging distance had to be reacquired during a probationary period. One of them goes so far as to say that his vision no longer possesses any "stereoscopic qualities." When he gazes at a room full of people, or at a long straight road dotted with traffic, he does not see objects standing out clear cut or silhouetted in space or against distance; the entire vista appears to him as flat and without depths as if he were looking at an ordinary photograph; and the loss of these stereoscopic differences is the sole difference that the loss of an eye has made to the quality of his vision. Nevertheless, distance is not necessarily or even mainly gauged by such stereoscopic differences, but by the apparent relative size of objects, and by the intervals or gaps seen to exist between them. Normal vision depends largely on apparent bulks and apparent gaps in judging distance; one-eyed vision depends upon them wholly; and the one-eyed man soon masters the slight adjustment required. After all, many men shoot with one eye closed.

Carburation at Starting.

I HAVE been straddled by several more salvos on the subject of heated carburetters, long induction pipes, and starting mixture with a cold engine, but I do not propose to quote these letters *in extenso*, or to argue very formally with their writers, because I feel that the more I study carburetters, the less inclined I am to dogmatise about them; a friend who conducts experiments with glass inlet pipes usually smashes any theory which I myself perpetrate, and I doubt whether these gentlemen who write from dug-outs or from studies really know much more about what happens inside an inlet pipe than I do. There are, however, one or two certainties which must be granted. The first is that the abbreviated stub inlet pipe of the vertical single cylinder warms up far more quickly than any other pattern in use on petrol engines, and, short of an electric heater for temporary use at starting, it must always do so, and on this one detail it certainly scores a practical advantage. Whether this merit is dearly bought or not is a point for debate by technical experts, and for decision by each of us in his own riding. The second certainty is that it is a simple matter to construct a flat twin which will fire perfectly evenly at as slow a speed as any other petrol engine, without load; possibly at a slower speed than any other type of motor cycle engine, excepting perhaps an ideal four-cylinder (no motor cycle four-cylinder has yet been standardised to run really slowly). If, as many correspondents assert, some flat twins cannot be induced to fire evenly at low speeds without a load, it is because they are badly designed.

Overstatement.

THE single *v.* twin controversy is showing more stamina than a correspondence on giant gooseberries, and both sides have indulged in overstatements of their own case, and in undue criticism of the opposing school. This was doubtless inevitable; there are plenty of indifferent single-cylinders, and there are a number of inferior twins, even in the "flat" class. The main points that have emerged from this prolonged comparison of the two patterns appear to be accepted somewhat as follows: the single-cylinder scores, as a type, in simplicity, power maintenance, pulling a high gear, and accessibility; the flat twin in balance, smoothness of drive, and ease of starting. If these conclusions remain justified when open competition restarts, we shall expect the flat twin to make an irresistible appeal to the riders who value comfort and refinement, whilst the vertical single should retain its *clientèle* amongst hard riders, who do their own tuning, and who—as I once heard it bluntly put—"prefer guts to gilt." I hope the controversy has done more than provide some of us with a whetstone for our wits and a chance of airing our argumentative powers. I believe it has warned a number of careless designers that the buying public appraises comfort higher than many would imagine. In other words, some manufacturers who are not converts to the flat twin, have been frightened by it into smoothing down alike their engine balance and their transmission shocks; and not before it was time.



THE HEAVYWEIGHT SIDECAR.

A SUGGESTIVE ARTICLE ON THE POST-WAR "CAR ON THREE WHEELS."

IN times of peace *The Motor Cycle* at this period of the year would be filled with details of new designs in motor cycles, sidecars, and accessories. Under present conditions, with the Government monopoly of the engineering and allied trades, improvements of this nature will be confined to such modifications as the war zone has rendered imperative.

This stagnation of new features is not without advantages. In the first case the strenuous duty to which machines are submitted in the war zones is eliminating many of the minor defects to which some makes were liable in earlier days, and the continuance of these conditions can only result in a better and more satisfactory machine. Further, it should be remembered in many cases previous to the war alterations were made to new season's machines piecemeal, sufficient to cause a new talking point or variation from last year's design, but with the intention of upsetting standardised jigs and manufacturing methods as little as possible.

A maker would frequently evolve an experimental machine comprising startling innovations, which would be kept in the background until a slacking off of sales compelled a change. With war-controlled outputs competitive improvement is dead, and ample time can be given to considerations of a post-war policy in search of an ideal machine which shall prove a lasting success.

One realises, with a sense of satisfaction, evidences of new designs in frames and springing devices and improvements in kick-starters, gear boxes, handle-bars, and the like. In short, there is no doubt that real improvement will be the by-word in the post-war machine, but there is still a great deal of headway to be made good before the published examples of these future mounts can be regarded as perfectly satisfactory.

No rider who has been compelled to carry out adjustments of even the most trivial nature can have failed to be impressed by the lack of accessibility, especially if a sidecar is an integral part of the machine.

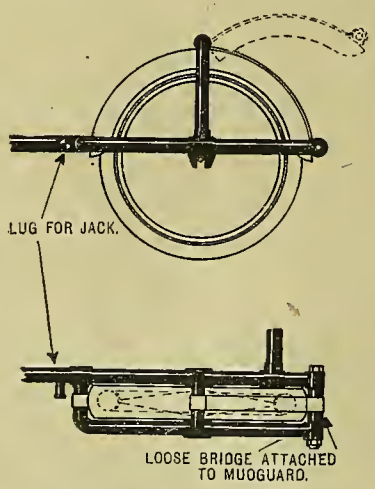
Not long ago—to be exact, on January 18th—Eric Williams, the winner of the last Junior T.T. and late Corporal R.E., gave his views on the post-war motor cycle. The following is an attempt by a practical rider to set forth the desiderata of an ideal sidecar outfit. In this, we think, our readers will agree that he has been very successful.

With the modern outfit the comfort and luxury of the passenger has been so well studied that it is now a question of considerable time and effort to detach the sidecar, and in the majority of cases it is certainly advisable not to attempt it. To overcome this, all parts requiring adjustment should be arranged in easily accessible positions and increased facilities given for cylinder removal and engine overhaul.

The Detachable Wheel Problem.

Assuming our new mount is fitted with the popular detachable and interchangeable wheel, a rider of less than super-normal physique will be confronted with a serious problem when he attempts to lift the rear of the cycle on the totally inadequate contraption called the stand on each occasion his back tyre punctures. And unless full advantage is taken of the time saved by the presence of a spare wheel and tyre inflated ready for use, one of the principal reasons for its existence disappears.

The obvious solution is to abandon the front, rear, and sidecar stands and equip the machine with a light, portable, quick-lift jack operated by a worm and removable handle on car lines. The forked projection at the top of the jack would engage with lugs brazed on the right chain stay, sidecar wheel support, and a point in front of the engine crank case.

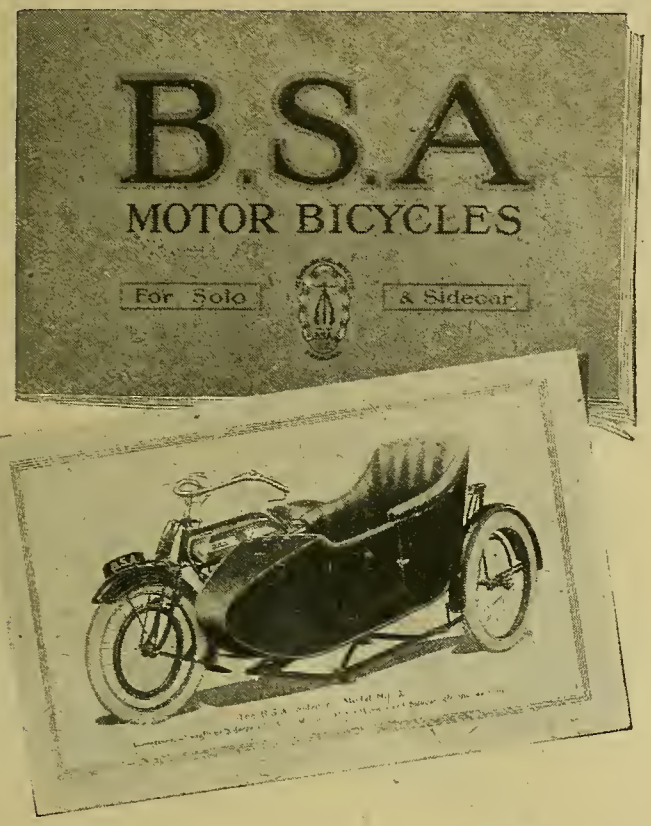


Suggestions in connection with sidecar manufacture worthy of notice. A hinged mudguard, detachable bridge, and lug for jack.

The removal of *any* wheel would then be a simple matter, and in addition, by jacking up the front of the engine, the front forks and steering head would be relieved of all weight and adjustment to these important points easily effected.

It appears desirable to have means for supporting the weight of the wheel while the loose spindle and packing collars are withdrawn or replaced. The car scores a great advantage here, as the fixed stub axle provides an immediate rest for the wheel, and leaves the hands free for screwing up.

Before leaving this part, the necessity for hinged lift-up mudguards *all* round should not be overlooked, and



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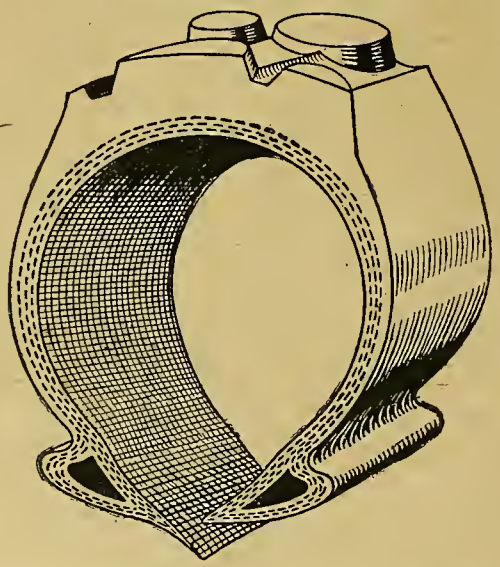

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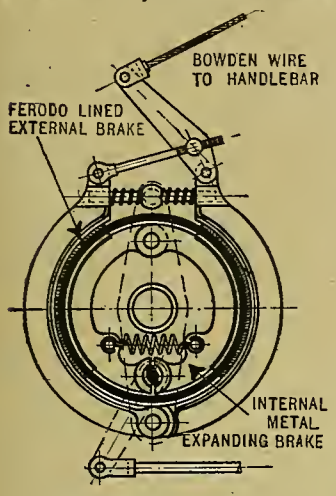
B2

The Heavyweight Sidecar.—

then by means of a detachable bridge in the sidecar wheel stays all wheels can be withdrawn without the necessity for lifting any part of the frame clear of the tyre.

Magneto Adjustment.

The magneto contact-breaker in almost every case is visible only from the left side, and as the sidecar body prevents access it is customary either to creep in between the sidecar and the front wheel or hang head down over the saddle. Either position is not conducive to accurate adjustment.



Both brakes are incorporated on one drum on the driving wheel, the drum forming part of the chain sprocket, and also carrying the speedometer driving ring.

If the right footboard be placed a little further away from the engine ample space can be found for a magneto bracket cast on the crank case timing cover with a bevel wheel drive as used on the Morgan Runabout. This arrangement is ideal for accessibility, as both ends of the magneto are equally get-at-able, and ample protection can be obtained from the footboard in conjunction with an undershield.

The carburetter question is more a matter of design than arrangement, and the writer holds strongly to the use of a special motor cycle carburetter designed on car lines (not an adapted car instrument) with single lever control, and having an adjustable pilot jet set for slow running in "free," with the throttle lever and main jet shut down.

To suit the needs of motor cycles, a hot air inlet pipe from the exhaust pipe or silencer is a necessity, and to meet the variations in fuel the induction pipe should be lagged with asbestos encased in thin sheet metal for protection. An additional advantage would be obtained from an exhaust by-pass to a jacketed jet chamber. If a tap were provided on the by-pass its use could easily be limited to cold weather or heavy fuels.

The Brakes.

With regard to brake gear, pending the design of a safe compensating device for the sidecar wheel, both brakes should be incorporated on one drum on the rear driving wheel. The drum should form part of the chain sprocket, and would also carry the speedometer driving ring. It need hardly be pointed out that this drum would be left permanently in the frame when the rear wheel was removed.

The foot brake, operated by a substantial ratchet pedal on the left footboard, should be of the internal expanding metal-to-metal type, and the use of the ratchet would permit of continued application on long hills or when standing.

The hand brake, controlled by an easily applied Bowden lever on the right grip, should be of the external contracting calliper type lined with Ferodo or Raybestos.

This pattern of brake has decided advantages over the ordinary band variety, and with a suitable lever system need be no more difficult to operate than a Sunbeam handle-bar clutch.

On the road the hand brake would be of value for traffic or cornering, and the foot brake for hills and emergencies.

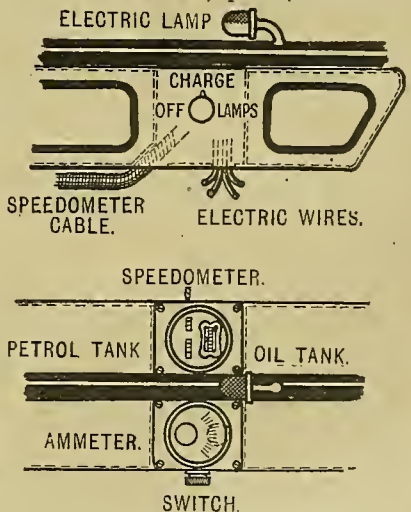
The clutch for a sidecar combination should be foot applied and of the metal multi-plate variety to withstand excessive slipping. The operation should be on car lines with a single-ended push-down pedal operated by the toe and with the heel in contact with the footboard as a fulcrum for the foot.

Power Unit.

For the engine I should like to see the 90° twin of about 8 h.p. given a fair trial, provided with enclosed valve springs and tappets, interchangeable valves, easily detachable cylinders without disturbing the crank case, and forced feed automatic oiling. The gear box should have at least three speeds—four would be better—obtained by test in conjunction with the engine, and bearing some relationship to the ultimate use of the complete machine. The shafts should be short and stiff, withdrawable from the left end for repair or cleaning by removing the end plate. An enclosed kick-starter would be fitted.

Electrical Details.

As dynamo lighting will be an essential feature on all modern machines after the war, provision should be made for a slow speed dynamo mounted on the top of the gear box and driven by an enclosed gear drive. The most satisfactory head lamp position is low down on the forks in the excellent position adopted on P. and M. and Douglas machines, and the tail lamp might be incorporated with the rear carrier or number plate.



Arrangements of electrical fitments. A separate compartment is suggested between the petrol and oil tanks.

It would conduce to neatness if provision were made for a switch compartment in the tank between the petrol and oil supplies. Access to the compartment would be obtained by removable covers surrounding the flush pattern ammeter and speedometer on top. An inclined outlet for the speedometer cable ro the rear wheel and for the various switch wires would be provided under the tank. To render the fittings visible at night a miniature electric lamp bracket with a half-opaque cover might be brazed

The Heavyweight Sidecar.—

to the top tube of the frame, and the wires carried through the tube into the top of the tank.

The electric horn would be sunk flush into the toe of the sidecar with only a brass ring and gauze projecting.

Finally, with regard to finish, the whole of the sidecar, chassis, frame, wheels, tank, lamps, handlebars, and all fittings should be enamelled some pleasing shade or shades, and nuts requiring frequent use of the spanner should be protected by bluing in oil, or by treatment of one of the patented processes. With the inclusion of such existing features as leaf springing all round, A.B.C. type adjustable and fork-clamped handle-bars, final drive from gear box to rear wheels by heavy roller chain in oil bath gear case on right side of machine, as used on Sunbeam motor cycles, and Coventry silent chain in cast aluminium gear box for engine drive, as on the Matchless and Rover, the future sidecar combination could indeed claim the title, "A car on three wheels."

FRANCIS E. SCHOFIELD.

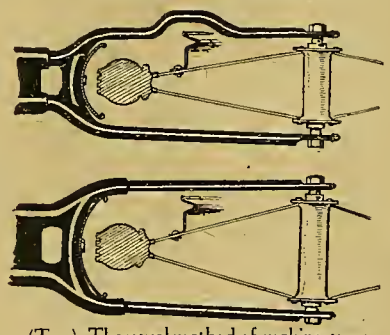
FRAME DESIGN.

A Plea for Straight Tubes in all Parts of a Motor Cycle.

A CORRESPONDENT (Mr. H. St. V. Addenbrooke) offers a few pertinent remarks on the subject of frame design, emphasising the advantages of straight tubes. He says: "There seems to me to be a great deal of room for improvement in frame design, and it would surely be a good subject to talk about during the war, with a view to improvement when the war is over.

"Firstly, is there any advantage in the bent top tube? Why do some manufacturers continue to make frames with bent top tubes? Surely those machines which have straight top tubes have proved that they are good (*e.g.*, Junior T.T., 1914).

"It stands to reason that, *weight for weight and reinforcement for reinforcement*, the straight tube must be stronger than the bent. A pillar which holds anything up is under compression; so is the top tube of a motor cycle. (For the benefit of those who say that this is not always so. I would add that a straight tube or pillar is also better able to withstand tension strain than a bent one.) What architect would support a building on curved pillars?



(Top) The usual method of making room for a belt rim. (Bottom) How it might be done and obviate the use of bent tubes.

"It has also many times been said that the front down tube, seat-pillar tube, and bottom back stays should meet in a point, as they do in a push bicycle. Yet how many motor cycle frames fulfil these conditions? There has just been a discussion about the bad frame designs of flat twin machines, but the above conditions are more easily complied with on a flat twin than on a V twin. The single, again, is an easy engine round which to build a well-designed frame. Then, again, there are many machines on the market with bottom back stays that are bent unnecessarily. I have got one at present, but *it has a straight top tube*. If a tube has to be bent out to clear a belt rim or anything, surely it can in most cases be done conveniently, where there is a lug, by making the lug wider between its tube centres.

"Perhaps some of the manufacturers of machines with bent top tubes will oblige by giving us the advantages claimed for the bent top tube. But I do not want to hear about reinforcement, as that makes the frame heavier, and is not necessary to so large an extent in a straight top tube."

FIXING A TARIFF.

A System of Progressive Protection Suggested.

THE basis of propositions with regard to the protection of trade after the war has been that a preferential tariff be fixed for the Allies as compared with neutrals. Before America entered the *Entente* she was the only neutral of consequence as regards the motor trade, but now that America has thrown in her lot with the Allies, she becomes eligible for the preferential tariff.

The only way of meeting the difficulty in a fair and just manner that immediately suggests itself is that the preference be fixed with due consideration for the date at which the nations concerned joined the *Entente* Powers, so that France, Belgium, and Russia, which have suffered most sorely both financially and otherwise, will be less hindered by the tariff than nations which have lost little.

It is conceivable that when peace comes America will be in as fair a position commercially as ever before, whereas Belgium and France have suffered loss and martyrdom, so that their crippled industries will require some support and encouragement for the general prosperity of the world. Italy, too, despite the comparative lateness of her entry into the war, has suffered more keenly than is conceivable as concerns the United States, so that a progressive preference based on the dates of entry into the war would be fair all round.

The Autocar states that in France American agents were delighted at the entry of America, for it was felt that, unless America took some part in the war for freedom, the anti-American feeling in France would be such that French manufacturers would use the strongest possible means in order to keep American machines out of the country. This feeling is now, happily, dispersed, and the continued prosperity of American trade seemingly assured.

SPRING WHEELS.

Spring Wheels are now Widely Used by the Army, and Great Strides have recently been made in this Line of Invention.

FROM the earliest periods of history but little alteration has been made in the principles of wheel construction and design. The solid wooden wheel with steel tyre was, for many ages, adequate for every type of vehicle.

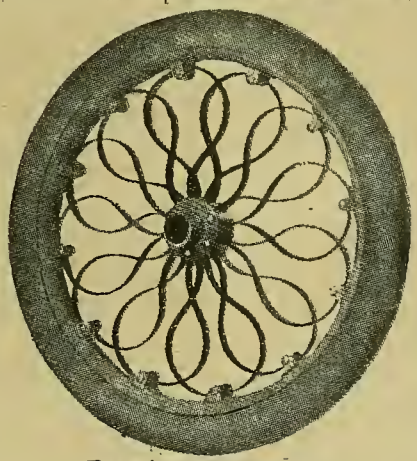
Good roads brought about the rubber tyre. After the introduction of light and faster vehicles the pneumatic tyre was evolved, but now that we have vehicles weighing anything up to 2 tons, and capable of speeds up to 60 m.p.h., it is not unreasonable to suppose that something better than the solid wheel may be introduced to meet the changed conditions.

The Possibilities of Shock-absorbing Wheels.

At any rate we cannot fairly close our eyes to the efforts of invention trending in this desirable direction. True, spring wheels of the past may have possessed conspicuous weaknesses, may, indeed, have been in the main "abominable contraptions," but, for that matter, the pneumatic-tyred wheel is not perfection. Its shock-absorbing properties are dependent on the narrow margin of tyre resiliency; the tyre is apt to puncture and strand one away from home, it is costly, and has a limited life.

So far as motor cycles are concerned, it is not to be anticipated that the spring wheel will ever eliminate the use of pneumatic tyres, but it would, in a perfected state, come as a valuable adjunct to the pneumatic tyre. Some ambitious inventors may even see in the spring wheel the secret of the rear springing problem, but, on the face of things, the spring wheel presents the same difficulties as those which stand in the way of the spring frame—namely, the wheel must be rigid in every direction (except radially) to resist lateral strains; it must be silent in action, and capable of withstanding long usage without rattling to pieces, and must be capable of withstanding the driving strains without wasting power.

Since the advent of motor vehicles the spring wheel has offered an unlimited field for inventive genius, but up to now with no permanent results. Recently, however, developments have been made,



The Ackerman spring wheel.

and it is encouraging to note that in Europe to-day there are many heavy military transport vehicles equipped with spring wheels in place of pneumatic tyres. Does this mark the period of a new development in wheel design?

Under Practical Test.

Except as concerns the question of weight, there is no apparent reason why a spring steel wheel, having no wearing parts, and giving a certain amount of radial elasticity, should not be applicable to motor cycles, and such an innovation is the Ackerman wheel, a product of the United States, which possesses resilient steel spokes, instead of the usual variety. According to the *Motor Mechanic*, an Ohio periodical, this wheel has undergone four years of practical test, and very extravagant claims are made for it. It is stated that this wheel, even when fitted with a solid tyre, imposes less jolting strain on the axle than a solid wheel having a pneumatic tyre, and that, when used in conjunction with the latter, the life of the tyre is decided by its internal durability rather than its outer wearing qualities. As regards the strength of the wheel, the provision for overload is such that a wheel in which 30% of the spokes are broken is safe to run, and it may be added that broken spokes can be replaced without removing the wheel or ever jacking it up.

Great Strength Claimed.

Apparently very extensive tests have been made, and on one test, under side thrust, a wooden wheel gave way beyond repair under a load of 5,530 lb. lateral thrust, whereas with the steel wheel the first signs of rupture appeared at 18,500 lb., and even then the damage was immediately repairable. On another test two wheels were tested simultaneously under a combined load of 13,000 lb. —nine times the load for which they were designed. The load was left for two hours, after which the wheels were removed and no sign of set or deflection was perceptible.

How far these claims may impress our readers is a matter of speculation, but it must be borne in mind that, if the spring wheel became a practical proposition, it would effect an enormous improvement in motor cycle design. The shock-absorbing properties of the wheel need not be great in order to assist very materially in the direction of comfort and reduced wear.

These spring wheels are light in appearance, yet capable of withstanding great strains. The type on the right was designed for American war motor cycles. Thirty per cent. of the double spokes may be shot away without putting the machine out of commission.

THE ADVANTAGES OF LARGE WHEELS.

An Attempt to show why the Bigger Wheel rolls more easily.

A FEW weeks ago "The Critics" discussed the interesting problem of large *v.* small wheels, and some of the advantages of the former were mentioned. However, owing possibly to lack of time, or the strength of the whiskey provided, or again to the comfort of the chairs before the blazing fire, no

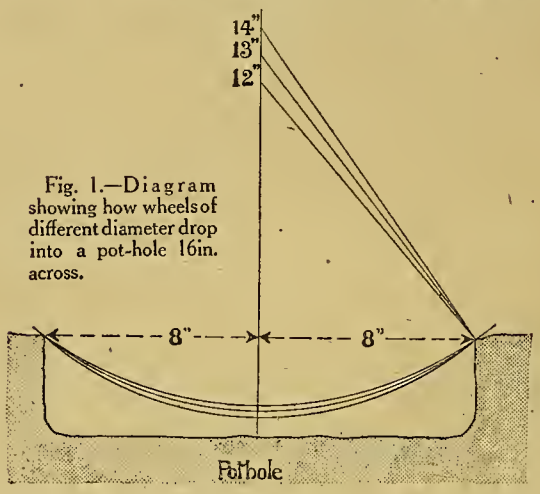


Fig. 1.—Diagram showing how wheels of different diameter drop into a pot-hole 16in. across.

one touched upon the greatest advantage appertaining to the larger wheel, viz., ease of propulsion and greater rolling ability over rough surfaces. The tendency of the smaller wheel to drop into pot-holes and thus cause more vibration attracted attention, but a reference to the accompanying diagram, fig. 1, will show that the difference in vibration which can definitely be attributed to the size of the wheel is very slight, and the enhanced comfort of the larger wheel must be due to a considerable extent to the larger section of tyre with which it is fitted and the degree of hardness to which it is inflated.

Dropping into Pot-holes.

Let us take first the case of a pot-hole 12in. across and of such a depth that the wheels will not touch the bottom; in other words, the pot-hole must be bridged by the wheel, and we find, by a simple calculation (or a carefully drawn sketch done to scale), that a

24in.	wheel will drop	1.6in.
26in.	,, ,,	1.5in.
28in.	,, ,,	1.4in.

or a difference of $\frac{1}{10}$in. for each 2in. of wheel diameter. If the hole be wider, the difference will be more marked and the drop greater, thus, into a pot-hole 16in. in diameter, a

24in.	wheel will drop	3.0in.
26in.	,, ,,	2.7in.
28in.	,, ,,	2.5in.

Here we have a difference of $\frac{1}{2}$in. between the 24in. and 28in. wheels, but less than $\frac{1}{4}$in. between the 26in. and 28in. These differences cannot be said to be excessive, and a 16in. pot-hole of unlimited depth is certainly a big one. In making these calculations, I have inferred that the edges of the pot-holes are firm and the tyre board hard.

I do not think that a difference of $\frac{1}{10}$in. would be noticed by a rider, and most pot-holes are far less serious, fortunately, than those which I have taken as examples. As a matter of fact, very few pot-holes over a foot in diameter are sufficiently deep to require bridging; the wheel simply runs in and out again, and the diameter makes no difference. Therefore, as I said before, we must look in other directions for the superior comfort of large wheels.

Ease of Propulsion.

When we consider the better rolling powers of the larger wheel we are, in my opinion, upon surer ground, and the advantage can be shown to be considerable. We will suppose that the front wheel meets a rigid obstruction 3in. in height, as shown in fig. 2. The front part of the machine will at once commence to rise, and the direction taken will be a tangent to the circle drawn about the centre A, where the tyre touches the edge of the obstruction, at the point represented by the centre of the wheel; or a line B C at right angles to B A. This means rising at an angle equal to A B D (D being the lowest point of the wheel), and the angle will rapidly diminish as the wheel rises over the obstruction A until B D coincides with B A, when the angle vanishes.

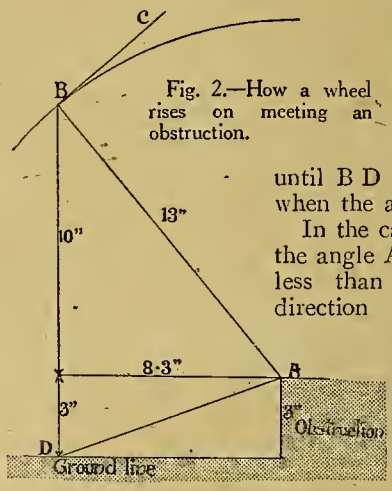


Fig. 2.—How a wheel rises on meeting an obstruction.

In the case of a 26in. wheel the angle A B D will be rather less than 40°, and as the direction of propulsion is parallel to the ground the effort required will be equal to the weight on the wheel (let us say 100 lb.) multiplied by tan A B D, and will be as follows:

A 28in.	wheel	will require	an effort of	78¾ lb.
,, 26in.	,,	,,	,,	83 lb.
,, 24in.	,,	,,	,,	89 lb.

Here we obtain differences which are by no means negligible; but it must be noted that the large efforts required are only momentary, and that the impetus of the machine helps to overcome them.

Without wearying the reader with calculations, it may be stated that the efforts required to lift the wheels out of the pot-hole to which we have previously referred are approximately as follow:

Size of wheel.	Effort required for 12in. holes.	Effort required for 16in. holes.
28in.	47.6 lb.	70 lb.
26in.	51.8 lb.	77.7 lb.
24in.	57.7 lb.	89 lb.

As the weight on the wheel was taken as 100 lb., the figures can be considered to be percentages of the weight. Incidentally, these figures show why a spring frame machine travels easily over bad roads.

AURIGA.

BRITISH MAGNETOS AND PROMPT SERVICE.

BRITISH magneto makers are evidently out to win the trade not only by sheer force of merit as regards the goods they produce, but by treating their customers promptly and courteously. Every motor cyclist takes an increased interest in the machine the makers of which have treated him generously and well, and very often a rider will purchase a particular make of machine simply because he knows he is assured of gentlemanly and considerate treatment from the manufacturers, who take a real interest in the service rendered by their productions.

Just the same applies in the case of a magneto or any other accessory, and recently we have received several letters from readers describing the prompt and generous treatment they have received from the British magneto makers.

The last case that came before us was that of a Coventry motor cyclist, who wrote to the Electric Ignition Co., of Birmingham, explaining that his E.I.C. magneto was in need of a slight repair, and asking the makers if they could undertake the work promptly, as he was needing the machine daily. The E.I.C. people replied that if he would submit the magneto complete they would give it a thorough overhaul free of charge and return within twenty-four hours.

The magneto was duly submitted, and the makers, having examined it, found it to be a clockwise model, running anti-clockwise. They therefore wrote to the effect that as the machine was urgently needed, and the conversion would occupy some little time, they were replacing the magneto by a new one, free of charge, which had already been despatched.

This is the sort of treatment motor cyclists appreciate and remember.

SPRING FRAMES AGAIN.

THE accompanying illustrations have been sent to us by Driver G. F. Campbell, M.T., A.S.C., who tells us that the front forks have undergone a three months' test with satisfaction.

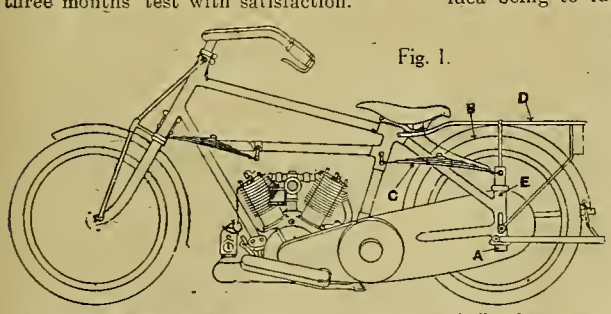


Fig. 1.

A. Sliding member drilled to take rear wheel spindle
B. Hinged mudguard to move with D
C. Cantilever spring
D. Corner "tie tube" to keep rear wheel true in forks
E. Hollow sleeve to take sliding member A

Fig. 1 shows the complete machine, and it will be noticed that cantilever springs are fitted both in front and at the rear, two in each position. The wheel is carried on the sliding part A, which is free to move up and down in the sleeve E, built rigidly into the frame. The parts A are connected by an inverted U-shaped strut which passes over the rear wheel.

Fig. 2 contains two sketches of the front forks, side and front view. Again a sliding piece A moves in a sleeve. The ball bearings of the steering head are carried by A, which does not itself revolve.

It appears likely that the sliding sleeves, especially those in the rear, would be very likely to get jammed by mud and grit in bad weather, and we should say that the lateral rigidity would be somewhat insufficient.

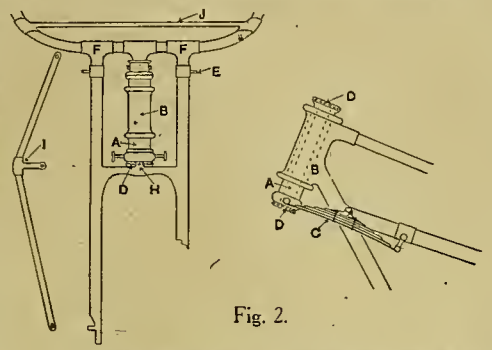


Fig. 2.

A. Hollow sleeve moving up and down in frame lug B
B. Frame steering lug
C. Cantilever springs to take road shocks, mounted on each side of frame, and fixed to hollow sleeve A
D. Enclosed ball bearings for turning movement of forks. Inner dotted line shows where handle-bars and centre fork tube turo
E. Bolt ends for front girders
F. Handle-bars with three-point fixing
H. Centre tube of forks
L. Girder

CADET MACHINE GUN COMPANIES.

WE are asked by Col. W. R. Ludlow, C.B., to point out that an excellent opportunity exists in Birmingham for youths of 16 to 17½, of good character, and having workshop experience, to join a cadet machine gun company and obtain instruction in the working of these most interesting guns. It will be remembered that Col. Ludlow suggested such companies in 1912, the idea being to raise a corps of 1,000 men accustomed to motors and motor cycles who would provide their own machines and transport. The War Office was approached with regard to a grant for maintenance and the supply of petrol, but this met with a cold refusal.

At the outbreak of war the Expeditionary Force had two machine guns per battalion as against twelve in a German regiment, and it is not necessary for us to enlarge upon the great value of such guns, as our readers are well aware of the excellent work done by the M.M.G.S. The War Office has now realised the great value of preliminary training in machine gun work, and an officer from the M.G.T.C. at Grantham has been appointed to the post of instructor at Aston. The service is voluntary, and the cost of uniforms will have to be borne by the cadet himself. We understand that similar facilities will be provided at Coventry.

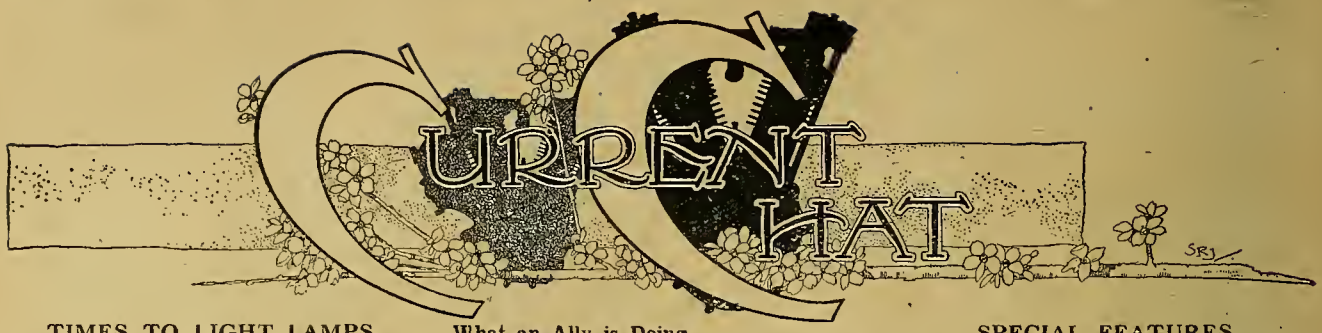
GIRLS DRIVE GAS CO.'s SIDECARRIERS.

GIRLS have replaced the male drivers of the South Suburban Gas Co.'s Alldays sidecarrier service. These machines are used daily between the head offices, Sydenham, S.E., and various branch offices and showrooms carrying correspondence, stationery, office books, etc. They are also used for the conveyance of the slot meter takings.

AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the figures for the preceding five weeks. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.J.S.	1916	6 combination	—	£96
„	1914	6 combination	£61	£56
„	1916	4 combination	£85	£90
Allon	1916	2¾ 2-speed	—	£33
„	1914	2¾ 2-speed	—	£27
Ariel	1915	3½ 3-speed	—	£45
„	1914	5-6 combination	—	£55
Bat	1914	6 3-speed	—	£46
Bradbury	1914	4 2-sp. sidecar	—	£44
Brough	1916	3½ 2-speed	£58	£56
B.S.A.	1916	4½ Mod. K. s-car	£60	£62
„	1915	4½ Mod. K. s-car	£55	£58
Calthorpe	1916	2½ 2-speed	£25	£36
„	1915	2¾ 2-speed	—	£29
„	1916	2½ 2-stroke	—	£23
Chater Lea	1913	8 combination	—	£35
Clyno	1915	2½ 2-stroke	—	£28
„	1914	6 combination	—	£65
Douglas	1916	2¾ T.T.	£45	£48
„	1915	2¾ 2-speed	£44	£47
„	1914	2¾ 2-speed	£38	£35
Enfield	1916	6 combination	£76	£76
„	1916	3	£45	£47
H.-Davidson	1916	7 combination	£84	£80
„	1915	7 combination	—	£68
Henderson	1916	7 combination	—	£100
Humber	1915	6 combination	—	£65
Indian	1916	5 combination	—	£65
„	1915	5 combination	£58	£55
„	1916	7-9 combination	—	£88
„	1915	7-9 combination	£68	£70
James	1916	4¼ combination	£65	£69
„	1916	2-sp., 2-stroke	—	£30
Levis	1916	2¼ Popular	£23	£25
„	1915	2¼ Popular	£20	£20
Matchless	1915	7 combination	£72	£74
New Hudson	1916	2-stroke, 2-speed	—	£28
„	1915	4 combination	—	£48
Norton	1916	3½ 2-speed	—	£47
„	1915	3½ T.T.	£48	£42
P. & M.	1915	3½ combination	—	£65
„	1914	3½ combination	—	£55
Premier	1915	2½ 3-speed	—	£28
„	1914	3½ 3-speed	£45	£46
Rover	1916	3½ 3-speed	£51	£48
„	1915	3½ 3-speed	£43	£40
Royal Ruby	1916	2¾ 2-stroke	—	£30
Rudge	1916	3½ Multi	—	£45
„	1915	3½ Multi	£39	£40
Scott	1916	3½ combination	—	£60
Sunbeam	1916	8 combination	—	£110
„	1916	3½ solo	£72	£72
„	1915	3½ combination	£80	£77
Triumph	1916	2-sp., 2-stroke	£38	£40
„	1915	4 countershaft	£55	£52
Zenith	1915	8 Gradua	—	£62



TIMES TO LIGHT LAMPS.

SUMMER TIME.

Apl. 26th	... ...	8.41 p.m.
,, 28th	... ...	8.44 ,,
,, 30th	... ...	8.48 ,,
May 2nd	... ...	8.52 ,,

Motor Cycles and Police.

In America and Australia motor cycles are being very widely used by the police. How long will it be before our own conservative police adopt similar methods of progress?

Another Use for the Sidecar.

In South London there are queues at the S.E. Railway sidings, where coal is sold in small lots. At Hither Green the other morning a motor cyclist was observed to take away his purchase of coal in a zinc domestic bath, which seemed just to fit his torpedo sidecar.

Road Racing in Western Australia.

The recent road race between Pinjarra and Perth, promoted by the West Australian Motor Cycle Club, was won by a rider of a B.S.A. motor bicycle with sidecar and passenger at the rate of 38 m.p.h. The road conditions were bad in the extreme, loose sand, gravel, and ruts being the usual thing for most of the distance.

The Flat Twin.

If the truth were known as to the marvellous performances of small flat twin engines, from the tiniest models up to sizes too powerful for motor cycle use, for searchlight and auxiliary aeroplane work, together with various marine uses, there would no longer be much doubt as to the post-war trend of motor cycle engine design.

"Sale or Return" still Existent.

The unexpected announcement was made at a meeting of retail newsagents last week that the Government did not propose at present to issue an Order for the abolition of the return of unsold newspapers. This intimation was conveyed in a letter from Mr. G. H. Roberts, the Parliamentary Secretary to the Board of Trade. Notwithstanding this supplementary statement we would still urge upon readers the desirability of ordering a regular copy of *The Motor Cycle*, as only by this method can a weekly copy of the paper be assured. Newsagents will, in their own interests, limit their supplies to the demands received, and by doing so achieve the economy and saving of labour which would have resulted had the Government enforced the order that was anticipated.

What an Ally is Doing.

French authorities recognise the national asset that the motor industry represents. Two-point-two gallons is the daily allotment of petrol in that enlightened country to owners of family cars.

A Belated Announcement.

Still the daily papers continue to make a dead set against motorists, no doubt in order to pander to popular opinion. They have just discovered the "drastic" decision of the Petrol Control Committee (issued weeks ago) to limit petrol to business and essential needs.

Inconsistencies.

You may not travel by train—but there is no alternative as petrol is scarce.

You must economise—train fare is much more costly than running a motor cycle.

Some of the warmest supporters of economy and "stop motoring" are the people who regularly spend week ends at the seaside or at an inland watering place.

Likewise some of the most talkative papers on the motoring and "economy" question are those publishing numerous advertisements of expensive hydros and hotels throughout the country in an endeavour to entice people thither. Such inconsistency is delightful.

Auto Cycle Union Notes.

ENEMY MACHINES AND PARTS.—The General Manager of the Cycle and Motor Cycle Manufacturers and Traders Union, Ltd., is, we hear, in full agreement with the resolution recently passed by the Auto Cycle Union to exclude from open competitions all motor cycles composed of parts of enemy origin, and also of entrants of enemy nationality.

THE GET-YOU-HOME SCHEME.—It has now been decided that the benefits of the Royal Automobile Club "Get-you-home" scheme shall be extended to motor cyclists who are town and country members of the Auto Cycle Union, and therefore associate members of the Royal Automobile Club. This scheme affords prompt assistance to the member who is unfortunate enough to be stranded on the roadside by the breakdown or disablement of his machine. It provides for the conveyance of the member and his passenger to his home or destination, if within twenty miles, or to the nearest convenient railway station, or, if possible, to convey or tow the machine and driver to his home, if within ten miles. Full details of the scheme may be had on application to the Secretary, the Auto Cycle Union, 83, Pall Mall, London, S.W.1.

SPECIAL FEATURES.

THE ADVANTAGES OF LARGE WHEELS.

THE SIDECAR DE LUXE.

A NEW LARGE SIZE FLAT TWIN.

The Scooter in Australia.

The Motor in Australia seems to be quite favourably impressed on the appearance over there of that weird little American production, the motor "scooter." In this little machine, by the way, the magneto is contained in the flywheel—a system we have advocated for lightweights.

Why Hinder Progress?

If motoring had done no good for the country; if, too, cars and motor cycles perfected in private owners' hands had not proved invaluable to the country in this war, one could understand the efforts of certain parties to crush motoring. Why should progress be hindered?

Water in Petrol.

Mr. J. Gilham, a Dublin correspondent, informs us that an old dodge for overcoming the water in petrol nuisance is to put some plaster of Paris powder into the tank. The powder will absorb the water but not the petrol, but one wonders which is the worse of the two evils from the carburetter point of view—water or plaster of Paris paste?

A Wideawake Yank.

Our contemporary *The Irish Cyclist and Motor Cyclist* tells of an ingenious idea carried into practice by a U.S.A. agent for increasing his sales. Finding out the birth dates of possible purchasers, he distributes small birthday souvenirs, each souvenir being accompanied by some pretty sentiment artfully blended with an inducement to buy a bicycle!

Some "System."

A correspondent informs us that some time ago he received a letter from the Petrol Control Committee asking whether he would like to renew his licence, and having furnished the necessary particulars, he received, after considerable delay, a notice to the effect that he was allotted two gallons per month for six months, and asking for 6s., which was immediately despatched. Two days later our correspondent received, instead of his licence, the usual stereotyped letter in which the Petrol Control Committee expressed its regret that, having considered his representation, the committee "could not see its way to alter its previous decision." With so huge a scheme mistakes inevitably occur, but this expression of regret is really rather humorous.

The National War Funds.

At the week-end the principal war funds stood as follow :

The National Relief Fund (distributed £3,582,551)	£6,103,261	0	0
The British Red Cross Fund ..	6,525,354	3	4
Tobacco Fund.	128,443	0	0

The Food Pinch.

Many of the best restaurants simply surpassed themselves on the occasion of the first meatless day. Salmon in every form, lobster, oysters, all sorts of wonderful fish and vegetable dishes, made up the menu of economy.

Resorting to Old Methods.

Why do the British authorities handle the petrol question in such an absurd and underhand way? They issue licences for a very meagre amount of spirit, and not satisfied with that, indulge in mud-slinging, *via* the daily press, at the people who use it. At any rate, that is how it strikes the observer.

Belt Drive.

It is rather surprising that no one appears to have adapted the variable pulley gear to lightweight machines. Belt drive, preferably countershaft, is undoubtedly *the* thing for lightweights, and with this type of machine the opening and closing pulley idea would obtain its advantages with its disadvantages considerably modified.

Bad Writing.

The Sub-editor of *The Motor Cycle* implores contributors to use typewriters. A hand-written MS. recently submitted was optimistically taken to deal with the current subject of valve design, but, failing to read it with any degree of certainty, it was sent down to the comp. room to be set up in type. When finally it came back headed "Eggs for Wounded Soldiers," the aged Sub-editor had to be carried to the fire-bucket for restoration.

Fuel Supplies in France.

Referring to petrol restrictions in France, a Reuter message, quoted in *The Times*, states that families will not be able to procure more than 1.76 pints a fortnight (this, presumably, being for house lighting), while the quantity of petrol allotted for private motor cars will not exceed 2.2 gallons per day.

One can picture the non-motorist sitting miserably in the dark while his motoring friends spend their evenings joyously touring country lanes.

Position of Flywheel.

That as a general rule amateurs experience much difficulty in removing the flywheels of their lightweights is proved by the number of enquiries we receive asking advice on the subject. After a year's running in all weathers an outside flywheel is invariably difficult to remove, yet it is to be observed that the flywheel is placed on the side which necessitates its removal on the occasion of a general overhaul. It is certainly desirable that the flywheel be in the transmission side, but there is no reason why its position there should lead to general inaccessibility of the magneto, etc. The design should be such that any ordinary adjustment or overhaul can be made without its removal.

Where there is Plenty.

After a visit to the leading motor cycle depots of Birmingham, one is impressed by the stocks of new and second-hand machines—especially in the way of lightweights.

The Limit.

Germany's gruesome use of the bodies of the dead has filled the whole civilised world with loathing. Long ago we were told by a motor cyclist from the firing lines that something of the kind was happening, but it then seemed beyond belief.

Institute of Metals.

At the annual meeting of the Institute of Metals, the four papers before the meeting dealt with matters relating to works practice in the metal industry. Manufacturers who have to deal with metal furnaces might be well advised to secure copies of these practical and timely papers, and all communications in regard to the research therein reported should be addressed to the Secretary of the Institute of Metals, 36, Victoria Street, S.W., who will be glad to help *bona-fide* enquirers.

Not All Joy Riders.

In the *Daily News* appears a paragraph which is one of the few we have read in the daily press doing justice to the motorist as a patriotic being. It says: "Joy riders, theoretically, are abolished; yet people who take war restrictions seriously are disturbed constantly by the sight of motor cars flying about upon errands in which pleasure, obviously, has at least a part."

"It is very easy to be misled," an official of the Petrol Control Committee told a *Daily News* representative. "Because you see a man enjoying a ride in a car you must not conclude that he is using petrol wastefully. Some have saved petrol in the past. No one is given a licence now to use petrol or substitute unless it is shown that the use of a car is necessary."

The First Motor Cycle to Fly.

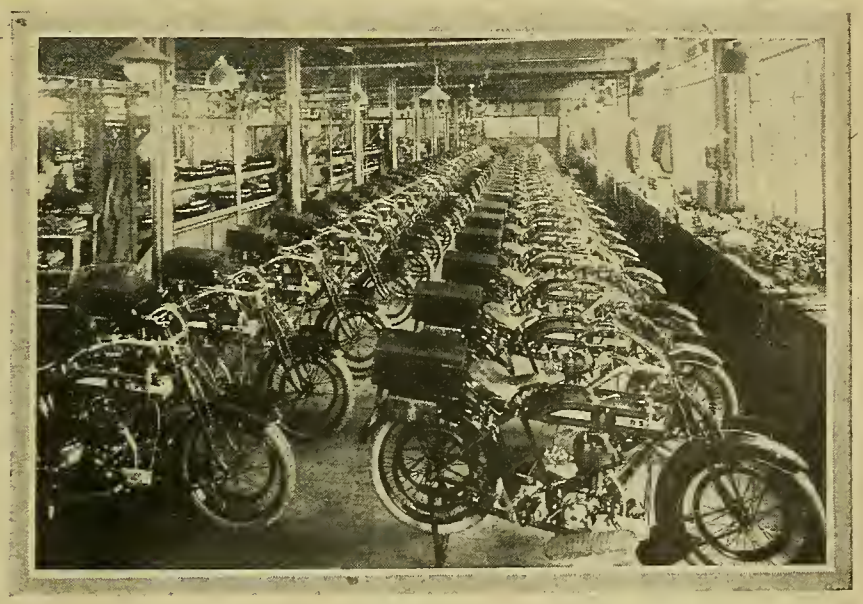
In *The Motor Cycle Illustrated* of April 5th appears an illustrated account of the first motor cycle to be taken up in an aeroplane. The machine is a lightweight flat-twin Indian, and it is secured to a platform aboard the aeroplane in such a manner that it can easily be removed. The idea of the invention is that by the use of the machine the pilot will, on alighting, be able immediately to make his way into country which does not permit a landing—the machine to be used generally as an adjunct to the aeroplane.

Gathering of Volunteer Motor Cyclists.

A proposal is on foot for a combined meeting at Blackpool of motor cyclists attached to the National Motor Volunteers early in June. Mr. S. W. Phillpott is the instigator of the meeting, and already several sections have promised support. Those in charge of Motor Volunteer Sections in the county and adjoining districts who would like to take part in the parade, should communicate with Mr. Phillpott, 22, Rodney Street, Liverpool.

Motor Volunteers—Separate Training Advocated.

The opinion seems to be growing among volunteer motor cyclists that their work would be rendered a good deal more useful to the country and interesting to themselves if they were separate from the ordinary car battalions or squadrons. An article on this subject appeared in a recent issue of *The Motor Cycle*, and it will be recalled that General McIntyre expressed his interest in and approval of the suggestions made. Those officers in charge of Motor Volunteer Sections who may not have considered the matter thoroughly would be well advised to do so, since other leaders are satisfied that it is the best method of procedure to train motor cyclists separately, and if—as the evidence before us would show—support for such change is general, representations in the proper quarter would, we fancy, have the desired effect.



A consignment of B.S.A. motor cycles ready for despatch to France. The machines are of the standard type, 4¼ h.p., with three-speed, chain-cum-belt drive.

MOTOR CYCLIST REPORTED MISSING.

AGAIN it is our unpleasant duty to record that a motor cyclist-airman is missing and his fate at the moment is unknown. The rider is Howard R. Davies, the Sunbeam exponent, who, in 1914, tied with O. C. Godfrey (another motor cyclist-airman, alas! no more) for second place in the Tourist Trophy Race, averaging 48.39

2nd Lt. H. R. Davies in flying regalia (reported missing).

miles per hour over the course of 225 miles. Lieut. H. R. Davies has not returned from a flight over the German lines on the 14th inst. Originally enlisting as a despatch rider in 1914, Davies was in 1915 granted a commission, and was for some months stationed at the R.E. Training Centre in Bedfordshire, one of his fellow officers being G. T. Gray, who was granted a commission about the same period, and whose death it was our sad duty to announce a fortnight ago. Davies was transferred to the Royal Flying Corps last year, and a month ago was promoted Lieutenant. Whilst home on leave, three weeks ago, he told acquaintances at the Sunbeam works of an exciting experience whilst flying at the Front. The controls of the machine were shot out of his hands, but he managed to spiral down and drop in "No Man's Land," and finally succeeded in reaching the British lines.

H. R. Davies, the Sunbeam rider, as he would be better known to motor cyclists.

U.S. TROOPS FOR FRANCE.

THAT excellent sportsman and ardent American patriot, Mr. Roosevelt, suggests that the Volunteer Forces should be used in connection with a portion of the Regular Army, "in order at the earliest possible moment to put our flag in the firing line." He asks leave to raise a force for immediate service Overseas, which will include a "motor cycle and machine gun regiment." Teddy Roosevelt is nothing if not up-to-date.

A MOTOR CYCLIST-ARTIFICER.

THE subject of our illustration is T. B. Haddock, well known as an A.J.S. rider on road and track. Cpl. Haddock has served eight months in the shops as artificer at an R.E. Signal Depot, and is expecting to be sent abroad shortly. In peace time Haddock was a very consistent performer on a motor cycle, and is well known in the trade. He won gold medals in the T.T. Races, English and Scottish Six Days Trials, London-Land's End, London-Exeter, London-Edinburgh, and Liverpool-Carlisle Trials, among others. At Brooklands, with a 350 c.c. sidecar,

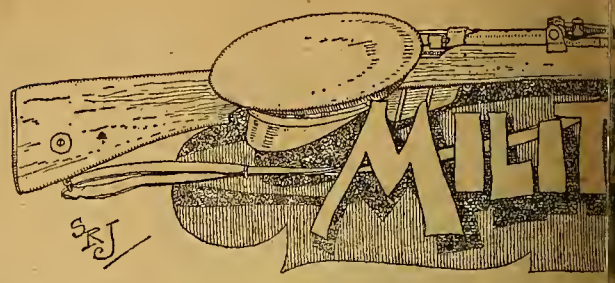
Cpl. T. B. Haddock, R.E

he set up world's records on one occasion, his speed for the standing ten miles with such a diminutive engine being 42.55 m.p.h., whilst in one hour, on the same single-cylinder A.J.S., he covered 41.43 miles. Creditable as were these performances, however, the figures were subsequently beaten by S. L. Bailey on a Douglas, whose figures still remain on the register.

THE WORK OF A MOTOR CYCLIST WITH THE MOTOR TRANSPORT VOLUNTEERS.

THE other day a motor cyclist attached to the Motor Transport Volunteers was on duty at Euston Station in the early hours of the morning, when a sergeant arrived by train who was due to report at Chatham as soon as possible. Owing to no fault of his, but solely to the fact that his train was very late in arriving, it was impossible for him to catch any connection which would have enabled him to reach Chatham in time, and he was therefore in great fear of receiving a severe reprimand, thus spoiling his record and possibly the chance of promotion. The motor cyclist member of the corps, however, kindly conveyed him direct from Euston to Chatham in his sidecar, enabling the man to reach his depot and report in good time, which would have been impossible by train.

Free petrol is offered for all work undertaken by members of the Motor Transport Volunteers. Additional motor cyclist members are urgently required in connection with further squadrons which the corps is now authorised to form. Application should be made to the Commandant Mr. C. R. Freemantle, Motor Transport Volunteers, 31, Walbrook, London, E.C.



VACANCIES IN THE R.N.A.S.

WE are informed by the Admiralty that vacancies for skilled ratings exist at the present time in the Royal Navy and in the Royal Naval Air Service, and considerable numbers of men of suitable experience are required.

Vacancies for petrol mechanics in the Motor Boat Patrol are few, and, so far as can be foreseen, it is not probable that many more men will be wanted for this service. Applications should be addressed, however, to the Auxiliary Patrol Office, Admiralty, Whitehall, London, S.W.1.

Some interesting particulars regarding enlistment in the Royal Navy appeared in *The Motor Cycle* of last week, on page 351.

FROM THE N.W. FRONTIER OF INDIA.

ALL over the world military motor cyclists are distributed, each having his special part to play in the world-wide conflict. The photographs accompanying were sent by Sergt. Makeham, attached to the A.S.C. Peshawar, India. They were taken on the

An ambulance car attached to the A.S.C. crossing a pontoon bridge on the Nagamon India

North-west Frontier of India, and Sergt. Makeham describes them as follows:

"One is of four despatch riders, which you will see, are mounted on true Triumphs.

"We have been out here a year, and the machines were the first W.D. Triumphs on this Frontier, and it plea

Notes

ay that they have upheld their though we have some terrible from the plains to the hill and also to the points where ting takes place. The roads are, very rough and sandy. Up to e of writing not one of us has ld up for engine trouble. On all s we have Dunlop covers, which haved splendidly, and we have n changed a cover. The four of shared about twelve punctures average mileage must be approxi- 8,000.

n a keen motor cyclist, especially in England, and I have had makes of machines. My machine n a good faithful friend to me ining this company; I would not it for any other, and as soon as r is over I intend to buy a n for my private use.

first complete motor ambulances e in India were Daimlers, and I s d to say we have been congratu- n the good work done on the . The Daimlers are worthy of ame, as they have had some work to do since being here.

other photograph shows one of ulances on a pontoon bridge; the eturning with sick from a block- situated some thirty miles from ar. Crossing this bridge by ycle is quite ordinary work."

Despatch riders on the North-west Frontier of India. Reading from left to right the riders are: Sgt. Moore, L.-Cpl. Farrar, Sgt. Makeham, and Sgt. Bloor.

A MOTOR LAUNCH MECHANIC.

Chief Motor Mechanic Victor Garland, who was formerly a regular competitor on Williamson motor cycles in the principal competitions of the A.C.U., including the Six Days Trials and other long-distance events, is in the H.M.M.L. Service, and is now serving on one of H.M. motor launches "somewhere in the Atlantic Ocean." He writes, "I long for 'trials' days again. I have been in the R N on active service for twelve months."

Chief Motor Mechanic Victor Garland.

DESPATCH RIDERS AND TRANSFERS.

TWO announcements in recent issues of *The Motor Cycle*, to the effect that despatch riders were required for the Royal Engineers' Signal Service, have brought many applications both to the Training Centre Headquarters and to these offices. Among them are a number of letters from motor cyclist readers already in the Services, requesting transfer. To all such we would point out that the correct procedure is to make application to his Commanding Officer. The C.O., if he can spare the man, will take all the necessary steps.

A SUGGESTIVE SIGNPOST.

THE accompanying reproduction shows a warning signpost recently erected in the vicinity of Wool, near Wareham. Standing by the signpost is Gunner C. Duplock, of the Heavy Section M.G.C. —the Tanks—a motor cyclist of many years' standing and a competition rider. In 1913 he competed in the Spring, Autumn, and Six Days Reliability Trials, and was also a competitor in the Streatham and Surrey club trials, driving a 6 h.p. A.J.S. sidecar outfit. Whilst admiring the good intentions of the local authorities in erecting the warning, we cannot refrain from remarking that the wording is somewhat ambiguous in view of the number of cheap American cars of a certain make on our roads.

NOTICE.
The Fords on this road render it dangerous for motor traffic.

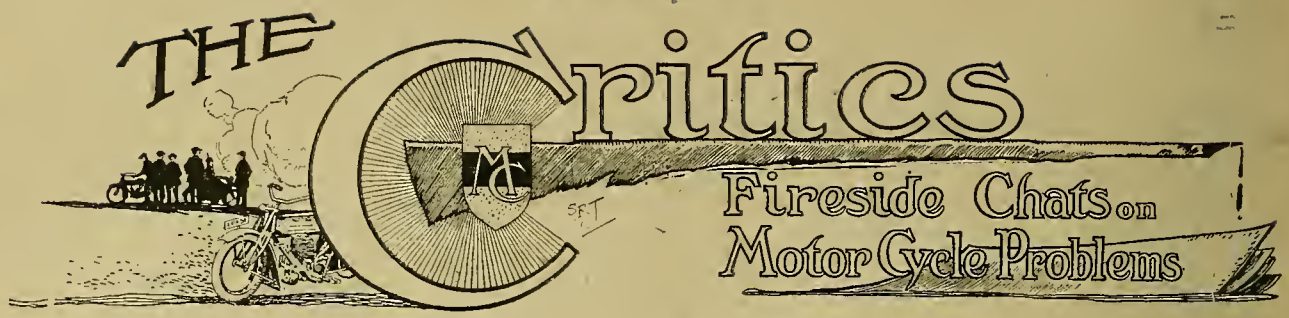
MOTOR CYCLIST VOLUNTEER COMBINATION.

Uniform Training Urged.

IT is felt in some quarters that with the large increase in motor volunteer organisations, and consequent enrolment of motor cyclists to work in conjunction with them, it is advisable for those having charge of such motor cyclists to combine and keep in touch with one another with a view to safeguarding their interests. Mr. S. W. Phillpott, who has had charge of the motor cyclists attached to the H.C.B. of Motor Volunteers, Liverpool, and has made a hobby of the movement, has made it his business to get into touch with similar sections in various districts and towns which he has happened to visit, and, in addition to this, has received a large number of communications as the result of an article which appeared in a recent issue of *The Motor Cycle*.

With a view to co-operation, and also, as far as possible, to assist uniform training and working, he offers to send to the leader of any motor cycle section a copy of the arrangements which are in force in his own section. It would possibly be a good idea for all who are in charge of motor cycle sections to communicate forthwith with Mr. Phillpott, and to consider the possibility of forming a combination of all these sections for mutual support and interchange of ideas. In some districts the motor cyclists are relegated to very minor positions, whereas we hold that they are worthy of the highest consideration. Mr. Phillpott's views on the question of independent separate motor cycle sections and units have already been expressed and General McIntyre has approved of the suggestions, which, we understand, are at the present time under consideration by the authorities.

Communications for Mr. Phillpott should be addressed to 22, Rodney Street, Liverpool.



ENGINES OF THE FUTURE.

It was evidently a somewhat peremptory passage appearing in the pages of a certain blue-covered weekly paper not unknown to motor cyclists which brought the matter to the Manufacturer's mind, for he kicked off with the daring statement that the luxurious sidecar machine of the future would be possessed of four cylinders, while the flat-twin would become the standard type of solo machine.

The Novice did not agree—naturally! He said that 80% of the motor cyclists on the road were unmechanical; and though a small number of four-cylinder machines would sell to the experts, the added complications would damn the type for the masses.

"Anyway," he added, "it is a fact that people fought shy of the T.A.C. owing to its complications, though it was a most attractive machine."

"But the T.A.C. was before its time," the Journalist pointed out. "It takes years for these things to become accomplished facts, and in engineering, a type of machine never flourishes before its time. However good it may be in principle, it is regarded by the majority as a freak, and the ideal in machinery cannot be arrived at except by the slow process of transition—built up on slowly accumulated knowledge."

The Question of Noise.

The D.R. stated that the post-war flat-twin would be good enough for him. "One hears people holding up the four-cylinder principle as ideal; but generally its strongest talking point, when sifted down, is the matter of noise. They talk about the silken silence of the four, forgetting that, with the four, it is merely a matter of continuity of noise, instead of the explosions being decently divided, as in the case of a twin or a good old plugging single."

"I don't agree with you there," said the Journalist. "The cylinders of a four are about half the size of a twin of the same power, therefore the explosions are obviously smaller—so small, indeed, that they can be completely muffled by the employment of a decent silencer."

"Perhaps so," agreed the D.R., "but, to my way of thinking, two decent pops are no more irritating than four small ones occurring in the same space of time. Then, quite apart from the exhaust, you have more reciprocating parts — notably valves—in the four than in the two. With a car this does not matter, because the engine is enclosed under a bonnet; but I bet that if you had no bonnet or dash, you would consider a car like the flat-twin Jowett more silent than the average four."

The Manufacturer thought that ere long motor cycle engines would be similarly enclosed by a combined wind scoop and leg shield. He did not think that everything would remain for ever open to the world, free to give and accept dirt and mud. "Total enclosing," he added, "may come hand in hand with the permanent 'four.'"

Internal Friction.

But the D.R., who was really in favour of the four-cylinder, was there to argue the matter out. "Internal friction," he resumed, "is another thing. It is impossible for a 'four' to be so efficient as a 'two' on this account. Then there are other things—the matter of transmission. A motor cycle does not lend itself to shaft drive, unless the enormous disadvantages of an indirect drive on top be accepted. In my opinion, the transmission is a bigger problem than the engine in the case of the alleged ideal 'four.'"

"I'm surprised at a man like you saying that," answered the Manufacturer. "I thought that everyone with engineering judgment and foresight regarded the shaft drive as ideal. One huge advantage of the 'four' is that it would enable us to employ the ideal transmission—the shaft drive!"

"What about the F.N.?" said the Journalist, indignantly. "In the later models with m.o.v., which raced in the T.T., the transmission was perfect."

The D.R. felt rather like the American gentleman who, arguing with his wife in the roof garden, stepped backwards on delivering the *coup de grâce*, and fell through a manhole into the water cistern.

But he was quickly revived. "Why not boost the three-cylinder?" he asked. "It seems to me to be better suited to motor cycle use than the 'four.'"

"It is neither one thing nor the other," answered the Manufacturer. "It is inferior in torque, and car engineering has proved that choice rests upon the 'four.'"

"But," answered the D.R., "that signifies nothing. In car engineering length of engine does not matter, and six cylinders can even be employed in line, which, you will admit, would be impossible in a motor cycle. As regards balance, the primary balance of the 'three' is superior to the 'four'; in other respects it is inferior."

"It has a 'couple,'" said the Journalist.

"So has the Scott," returned the D.R., "but no one would complain about the vibration of a Scott. As regards torque—that's all my hat! I refuse to believe that at a speed over 15 m.p.h. the most skilled tester could judge any difference in the explosion intervals of a flat twin or the best 'four' you care to shove under him—given no exhaust to go by."

Measuring Trouble by the Number of Cylinders.

But the D.R. had gone off on a side issue. No one seemed disposed to follow him further. The Manufacturer turned to the Novice.

"The idea that an increased number of cylinders means a proportional increase as regards attention and unreliability is an absolute fallacy," he stated. "You want to get it out of your head as an arguing point. It might have applied in the days when we knew nothing about lubrication, when sparking plugs were unreliable, when we had automatic inlet valves, and did not know how to make exhaust valves, but it does not apply to-day. If it did, how is it that 90% of the cars on the road have four cylinders? With them one never opens the bonnet except to flood the carburetter. Plugs and valves are never thought of month after month. If your arguing were correct, what chance would the twelve-cylinder car have in America?"

"Water-cooling," muttered the D.R. "The reliability of multi-cylinder valves and sparking plugs is dependent on the efficient and equal cooling of all the cylinders. That is what we cannot obtain in the motor cycle."

"Then what about modern aero engines?" queried the Manufacturer.

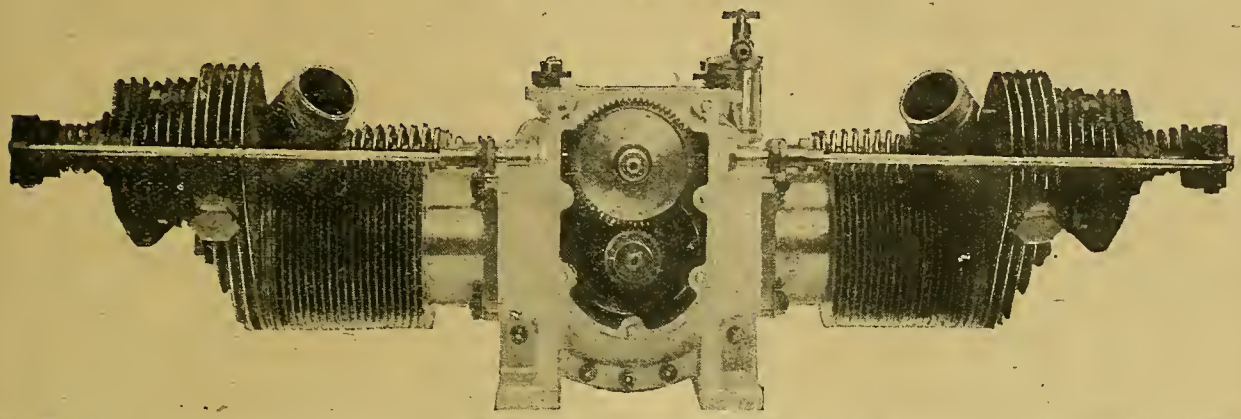
"A different matter. They are exposed to tremendous draught, unhampered by the proximity of the road, and wind scoops can be used. Yet the problem of cooling all cylinders equally is a big one even with aero engines. One has to shield the front cylinders and concentrate draught on the back," stated the D.R.

"The difficulty is not insurmountable," replied the Manufacturer. "Every line of motor engineering has adopted the 'four.' With it the strains throughout the engine and transmission are reduced—hence its marvellous reliability. Why should we be so reluctant to admit it, obviously the ideal principle——?"

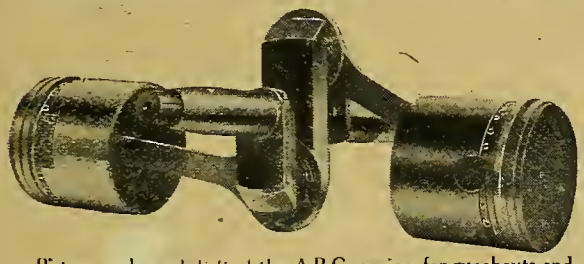
"Because," replied the D.R., "it means altering your plant, your patterns, your plans—it means expense. It means what the Americans call getting no end of a son of gun of a hustle on. That's why it hasn't materialised hitherto. Anyway, here's to the 'four' of to-morrow—the ideal mount. Cheer-o!"

A NEW LARGE SIZE FLAT TWIN.

The 1,094 c.c. 10 h.p. A.B.C. Engine, 90 mm. × 86 mm., developing 20 h.p. at 2,500 r.p.m., and 25 h.p. at 3,000 r.p.m. 65 lb. represents the Weight of the Engine, and 20 lb. the Gear Box.



MANY people are under the impression that the flat twin can be successful only when the cylinder dimensions are small. That well-known designer, Mr. Granville E. Bradshaw, does not, however, agree with this opinion, and with good reason, for he has made a new A.B.C. cycle car engine to come within the 1,100 c.c. class of which he has the highest hopes, and has also built a very much larger horizontal twin which is giving entire satisfaction.



Pistons and crankshaft of the A.B.C. engine for runabouts and cycle cars. The shaft is 1⅛in. in diameter and supported by ball bearings. Note the recessed and drilled piston, the object of which is to prevent oil being forced past the rings.

This engine was not designed for a motor bicycle, but will undoubtedly be a success in a light road vehicle, and is interesting to motor cyclists as proving that 350 c.c., or even 500 c.c., is not the limiting size of a satisfactory flat twin. Lightness is one of the chief features of the former engine, which has a capacity of 1,094 c.c., and with carburetter and magneto weighs only 65 lb., while a gear box weighing 20 lb. has been designed for it.

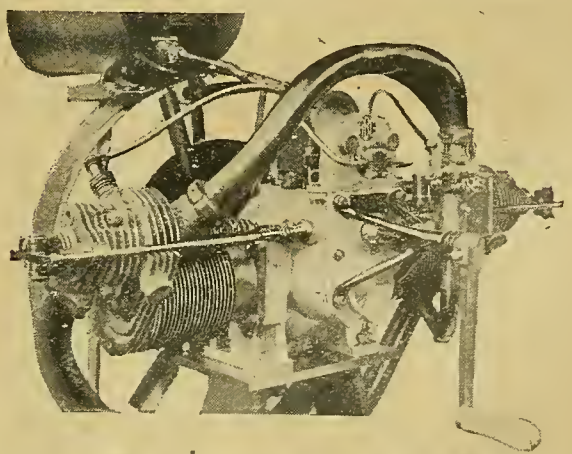
The Engine.

In exterior design it very closely resembles the 3½ h.p. 500 c.c. A.B.C., which is so familiar to our readers. The cylinders are machined from a solid steel bar, and have wonderfully fine radiating fins, on which copper has been deposited to assist in dissipating the heat. The cylinder heads and exhaust valve domes are of cast iron, and are bolted on to the steel cylinders. As in the 500 c.c. engine, the exhaust valve is overhead and the inlet valve beneath it, so that the former may receive the benefit of its exposed position and be readily cooled.

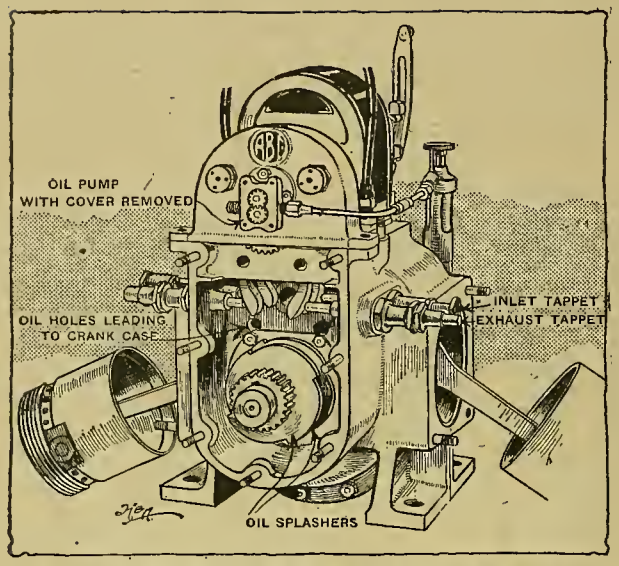
The pistons are of cast iron, and have the same diameter throughout. Two rings are fitted, while beneath the bottom ring is a series of holes, the object of which is to prevent oil being forced past the rings by allowing it to return to the interior of the piston.

The connecting rods are, as in the case of the smaller engine, fitted with roller bearings at the big ends, while the gudgeon pin ends are provided with floating bushes. Moreover, the connecting rods are so narrow that they are almost in line, and consequently the crankshaft does not have to be specially balanced. The method of fixing the gudgeon pin, which has so long been a feature of the A.B.C. on the 3½ h.p. engine, is retained in the larger model. The crankshaft, which is 1⅛in. in diameter, is on the timing side supported by two ball bearings, one each side of the main timing wheel, while on the other side there are two further ball bearings at a convenient distance apart.

The aluminium crank case is divided in the centre, and is so designed that it occupies very little space. All studs entering the aluminium are pinned, and the four ball bearings are carried in steel housings, so



A new flat twin A.B.C. of 90 mm. × 86 mm. = 1,094 c.c. This engine develops 20 h.p. at 2,500 r.p.m., and 25 h.p. at 3,000 r.p.m. This is equivalent to a weight efficiency of 2.6 lbs. per h.p.



Timing case cover removed, showing shape of rocker arms, oil splashers, and oil holes in dividing plate.

that everything fixed in the aluminium has its security absolutely assured.

We were especially struck by the ample size of the cams and timing wheels. The tappets, it may be stated, are adjustable, the inlet valve tappet being of the usual design while the exhaust tappet has a hollow end into which a ball-ended rod fits. The overhead valve gear and exhaust rocker spindle are of ample dimensions, and so will not give trouble through rapid wear.

Lubrication.

The lubrication is effected by means of a tiny gear wheel pump, which delivers the oil through a throttle controlled drip feed in a predetermined quantity to the crank case, whence after a certain level has been reached it overflows into the timing gear chamber and thence is directed by means of special splashers carried on the end of the main shaft on to the cams, cam links, and the ends of the tappets.

On the occasion of our visit to the works, the engine was fixed in a frame and placed upon the ground. This tubular frame was not secured in any way, and yet the engine showed remarkably little tendency to move, even when running at a high number of revolutions. It proved itself capable of turning over at a great speed and with a minimum amount of vibration. It also started easily. In the particular engine demonstrated to us the starting handle was on the camshaft, but in the engine which is to be fitted for the road it will be coupled to the mainshaft.

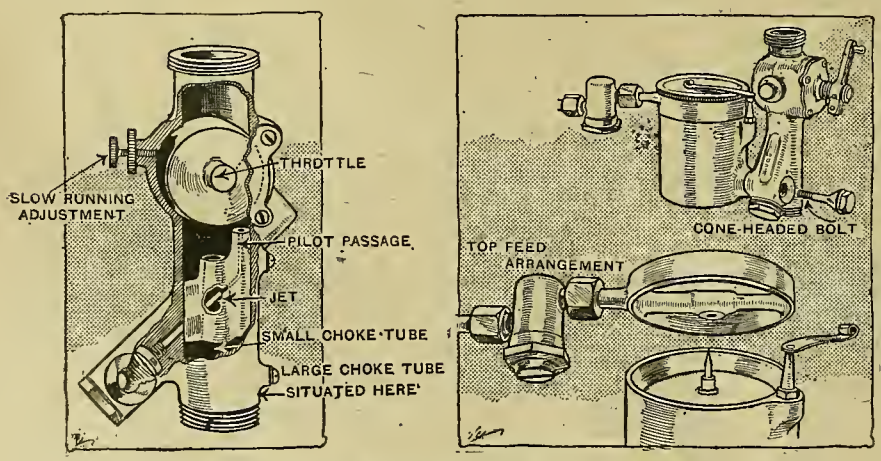
The New Carburetter.

Not the least interesting feature is the new A.B.C. carburetter, which has been thoroughly tested, not only on the larger engine, but on the motor bicycle as well, and it has been found to realise the expectations of its designer to the full. The working of this carburetter was described in *The Motor Cycle* of December 21st, 1916, but the illustration was purely diagrammatical. We are now able to show some sketches made from the actual article which clearly illustrate its working, the only difference being that in the carburetter shown to us there is no tapered needle running through the jet. Such a needle, however, will be fitted when this engine is attached to a road vehicle, and will be controllable from the handle-bar, or, in the case of a cycle car, from the dashboard. This tapered needle arrangement is no novelty. It has been used with success on many makes of carburetters, both British and American, while a similar idea was employed by J. Van Hooydonk years ago on a Phœnix Trimo, though this was not handle-bar controlled.

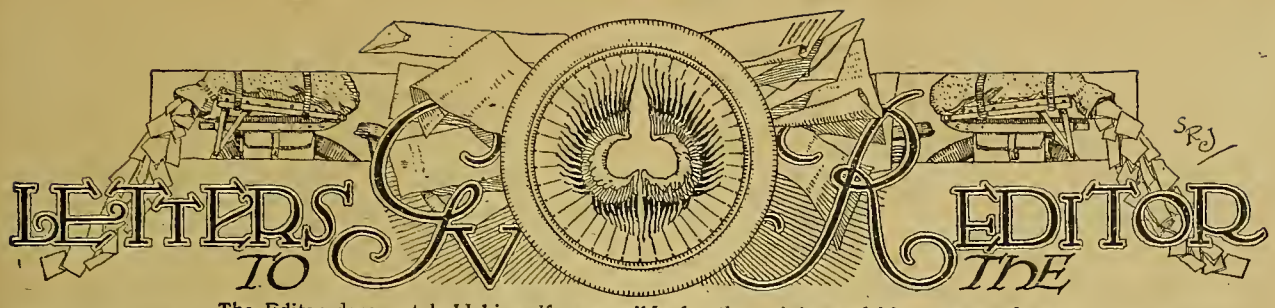
The cylinders are machined from a solid steel bar, copper afterwards being deposited on them to assist cooling. The cylinder heads and exhaust domes are of cast iron and bolted to the barrel of the cylinder.

The chief novelty in the carburetter since it was last described in these pages is the method of converting it to top feed. A ring-shaped casting is turned accurately to fit the top of the float chamber, while through it runs a pipe blocked at one end, and in the centre of this pipe there is a seating for the needle valve. Over the top of the ring the carburetter lid fits, the whole being held in position by means of the spring provided for the purpose. Before reaching the carburetter the petrol passes through an Enots filter. Thus top feed is employed and balance weights discarded, and the petrol pipe may be fitted in any position desired.

Certainly the engine suggests great possibilities, and should assist very considerably in the materialisation of the true cycle car.



Interior of the A.B.C. carburetter vaporising chamber, showing barrel throttle with the slot registering with the pilot passage. On the right is a general view of the carburetter.



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

THE MOUNTING OF SPRING FORKS.

Sir,—I am afraid Mr. J. Clinton Smith does not state any clear reason for No. 3 not working well. Has Mr. Smith ever seen a Matchless spring fork, and can he state any reason for it not working well, for the shackles are by no means parallel, being arranged as in No. 3? I should be pleased if Mr. Collier would let Mr. Smith know his reasons for mounting his forks in this manner.

Northampton. SPRING FORK.

"SOME" BICYCLE.

Sir,—Captain Paine, in *The Motor Cycle* of April 12th, states that his 2½ h.p., two-stroke, fixed gear 5½ to 1, will climb: (1.) Elm Grove, Brighton. (2.) Hill from Preston to Dyke Road, Brighton, missing the one in three portion. (3.) Beachy Head from all directions. (4.) A hill near Brightling, Sussex. May I ask Captain Paine what hill he refers to when he says "the hill from Preston to the Dyke Road"? Does he mean "The cinder path," as it is generally called? Also may I ask where I can find the "hill near Brightling, Sussex—the second worst in Sussex"?

I may say that I have taken two up the "cinder path" on a 1916 2¾ h.p. Douglas, both of us weighing a little over nine stone. A. H. COX (Junior).

THE PAY OF DESPATCH RIDERS.

Sir,—May I request the assistance of your valued paper in the following matter.

At the outbreak of war my eldest boy enlisted as a motor cyclist despatch rider, and has continued up to now upon the same duty. He was promptly sent to France, arriving there on August 19th, 1914, but seventeen months ago responded to a call for volunteers for the Eastern Front, and was sent to Salonica. He enlisted at Chatham at a rate of 5s. per day. After two years and seven months of service he was notificd that an error had been made in his enlisted rate of pay, which should be 3s. per day, and he is brought in debt £34 2s. 10½d., and his pay stopped until this amount is made good. I am informed this is no isolated case, but arbitrary reductions of pay are frequent. I would like to obtain reliable information of reductions similar to my son's, and am willing to combine for mutual help and protection.

Will any of your readers having actual knowledge and details of such cases kindly communicate with me on this matter? JOHN GARDNER.

5, Albany Road, Coventry.

"THE MOTOR CYCLE" SPRING FRAME CAMPAIGN.

Sir,—I am very interested in the spring frame question, and think that, owing to the deterioration of the roads, it is of growing importance. Yonr campaign is excellent, and every endeavour should be made to further the real spring frame. Such devices as the Bat and Edmund, although undoubtedly excellent "half-ways," should certainly not be classed as spring frames. There are two objects in view—one to ensure the comfort of the rider, and the other to increase the useful life and reliability of the mechanism. This latter increases the comfort of the rider both mentally and physically, and is quite as important as the first. The devices named insulate only the rider from shocks, but the mechanism is subjected to the same disastrous battering as before. Real spring frames, such as the Indian, Douglas, A.B.C., Matchless, etc., are the kind the public will buy.

Every success to your campaign for real spring frames and straight tube frames. C. C. AUDREY.

LONG INLET PIPES.

Sir,—I have just read "Ixion's" "Occasional Comments" in the issue of April 5th re long inlet pipes, and I may say that I have had some experience in this line, and agree with Mr. Bradshaw.

Personally I much prefer a long adequately heated inlet pipe with as few bends as possible, the reason being that I imagine (though pleased to be corrected) a long pipe allows a cushioning effect of the mixture between valve and carburetter. This advantage should be most marked in a single-cylinder engine running slowly, which I find is the case.

I noticed a few lines in *The Motor Cycle* about water forming on the sparking plug points of a water-cooled engine. I have had the same trouble on various occasions, and should be pleased to hear of any remedy besides changing the plugs, which I have sometimes had to do twice with large engines.

W. J. CLIFFORD COOKE (Cpl., M.T.)

AN ECONOMICAL TWO-STROKE.

Sir,—I was extremely interested to read "Chinook's" article on the Velocette two-stroke in your issue of March 29th. I also am fortunate in being the rider of one of these machines, and it has always given me entire satisfaction. The present is the second motor cycle of the same make that I have owned, and in the course of twelve months' riding under all conditions they have never failed to deposit me safely at my destination. No engine troubles have ever arisen in these machines, nor ever seem likely to.

Last year I made a careful test of my fuel consumption. Having emptied the tank and carburetter, I poured in a carefully measured gallon of Shell II., and then rode the machine as usual until it stopped for lack of petrol. The speedometer showed that I had covered 155 miles on the gallon, and this included a ride right across London and through the heart of the City, and seven starts!

I agree with "Chinook" that much of this economy is probably due to the excellence of the automatic lubricating system, which I think is one as near perfect as we shall ever find in this wicked world!

I use a Senspray carburetter, with No. 24 jet, and as I apparently get as good results as "Chinook" does with a B. and B., this bears out my belief that it is excellence of engine design which makes the Velocette such a success.

My machine will run at 3 m.p.h. without four-stroking and up to about 35 m.p.h., will go up simply *any* hill, and *cannot* be made to overheat.

I have done (more than once) a day's run of 147 miles at an average speed, on one occasion, of 22 m.p.h., the engine running perfectly all the time.

It will always paddle off from cold, and when I was recently home on leave in England I took it out to see what it would do. I had not touched it for six months. There was still some petrol in the tank, and I pushed it off, just as it was. It fired at once, and I rode ninety-three miles on it that day, with no trouble except for one stoppage, after doing about five miles, owing to the rocker arm sticking on its fibre bush. How many other makes would do this after a six months' absolute rest in a shed?

I agree with "Chinook" that 26in. wheels are desirable; but there is no other radical alteration necessary, in my opinion, except perhaps an improved, and more extensive, chain guard. CAPT., R.A.M.C.

B.E.F.

BRITISH V. FOREIGN MAGNETOS.

Sir,—We desire to emphasise the points raised in your last issue by the Electric Ignition Co., Ltd., that we are not fitting our motor bicycles for war purposes with foreign magnetos from choice, but are acting on the instructions of the Government department concerned. There are, no doubt, good reasons for these instructions having been given.

We shall not fit any foreign magnetos whatever to Rover motor cycles whenever the matter is left to our discretion, and we further beg to add that among British magnetos we have found the E.I.C. magneto very satisfactory.

THE NEW ROVER CYCLE CO., LTD.
F. L. ALLEN, General Manager.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—It can safely be assumed that anyone deaf or partially blind would not think of riding a motor cycle unless he was a confident rider.

The other side of the question is this: Is it fair to other riders to allow a person who is deaf or partially blind to hold a driving licence?

It is certainly unfair to deprive such a person of what may be his greatest pleasure. Therefore I suggest that driving licences should be granted on the condition that some form of warning be given to other motorists, such as a *special mark or letter painted on the rear number plate.* G.G.

B.E.F., France.

Sir,—I have been interested in the correspondence as to who should hold driving licences, and, as a colonial rider, I must admit that I was very greatly surprised the other day, when taking out a driver's licence, that I was not even asked whether I was capable of driving a motor car or cycle.

In this respect I consider that many of our colonies are much more up to date in their procedure, and the following, which is necessary to obtain a driving licence in Uganda (British East Africa), may interest your readers:

"An applicant for a driving licence must appear before a licensing officer with the car or cycle he or she intends to drive, and must, in that officer's presence, undergo a driving test." The licence is then endorsed with the description of the machine ridden or driven.

If it is intended to drive different types of cycles or cars, the different types must be specified on the licence.

In the case of experienced drivers and mechanics the licence is sometimes endorsed, "To drive all manner of internal combustion engined vehicles," but this is not done until they show their ability to drive the different types.

Thus, a rider whose licence is endorsed, say, "2¾ h.p. Douglas," would be liable to prosecution if found riding a 7-9 h.p. Indian until he had been tested with the higher powered machine and had the same endorsed on his licence. Likewise a driver whose licence is endorsed Ford car would be liable to prosecution if found driving a 40 h.p. Daimler until tested.

In a country like Uganda, where there are so many native African and Indian drivers, you will readily see that this procedure is very necessary, and I certainly think that a modified form is necessary in England. Applicants for driving licences should at least be forced to pass a driving test before a licence is issued. COLONIAL.

Birmingham.

Sir,—I have followed with interest all the correspondence in *The Motor Cycle* on this subject, being especially interested in the one-eye question.

I have for some time thought of giving my experience, and the appeal of "C.Q.M.S." in your last issue has decided me.

I may say I lost the sight of my left eye six years ago in a sidecar smash while on the carrier. I have now ridden for twenty months a solo lightweight, turning out practically every day on it in all weathers, including this winter's snow blizzards, while running to and from work, through a town with bad turnings, bad surface roads, and tramlines.

During all this time I have never had an accident worth mentioning other than trifling skids. I have also used the bicycle for many lengthy spins, often with a pillion passenger.

Some time ago I was fined 6s. for driving at a speed dangerous to the public, and a second summons at the same time was issued against me for failing to stop on the request of a policeman. The summons was quashed for the following reasons:

(1.) The policeman put up his hand only when level with me, and as he was on the left side of the road I failed to see the signal, although I had seen him standing there while he was still ahead of me.

(2.) Because my nose blocked the line of vision from the policeman's raised hand to my right eye.

This is the only time that my eyesight has been called in question, and in this case, as I have said, the summons was dismissed.

I have also, with only one eye, driven a motor car, and never found the slightest difficulty in steering.

Granted for the first year after my loss I could not judge distances, but since then my good eye has automatically adjusted itself to allow for the loss of stereoscopic effect, and I can now steer through the closest limits with confidence.

No man with two perfect eyes can with justice sit in judgment on a one-eyed man and say he is to be deprived of the privilege of motoring, owing to his misfortune, because he is a public danger. W. I. S. KELWAY.

MOTOR CYCLIST'S VIEW OF THE CORK FACTORY.

Sir,—It seems to me that the Ford activities in Cork, and the fact of having a large factory, giving a very considerable amount of employment, will be of undoubted advantage to the Cork and District Motor Cycle Club, as well as to the city in general.

As you know, few sporting riders have been attracted from the two-wheeler to any light car proposition yet on the market, but in the event of the Ford people putting a really sporting light car on the market, at a price that will compete with the sidecar outfit, the Club would be always ready to extend its competition programme so as to cater for those of its members who would give up the two-wheeler for the light car.

Our trade members should also benefit by the coming of the Ford factory owing to the increased prosperity of the city, which is bound to bring with it an increase in the number of potential buyers. RONALD S. RUSSELL,
Hon. Sec. Cork and District M.C.C.

DYNAMO LIGHTING FOR MOTOR CYCLES.

Sir,—I would like to record my appreciation of the series of articles under the title of "The Critics." This method of putting forward the pros and cons of matters of topical motor cycling interest frees the article from all bias, and leaves the reader better informed without the impression of being convinced against his will.

With regard to the article in your last issue, I am glad to see the matter of relative weights of acetylene and electric installations has been raised. The question of suitable design may be approached from two different directions: that of the standard car dynamo, and also from the standpoint of the miniature direct-lighting alternator which has been in use for some years on pedal cycles. The evolution of the ideal solo lighting dynamo will doubtless result from a combination of the reliability and convenience of the former with the simplicity of the latter.

I lately saw a 4 h.p. W.D. solo Douglas fitted up with a dynamo which was supplying current to a three ampère head light, a speedometer lamp, and a rear lamp. The weight of the dynamo was stated to be 5½ lb., and the information was given that the machine had given excellent service on several machines since the spring of 1914—before many of us believed in the possibility of a satisfactory dynamo lighting set for solo machines. That this by no means represents the limit in the direction of lightweight dynamo design must be obvious, as in these days of feverish energy in all branches of engineering no doubt a great deal has been done since 1914. In fact, but a few days ago I was privileged to see the tests of a small electrical generator designed for a purpose which must not be divulged, and was considerably astonished to see an output of 10 volts 3 ampères being maintained in still air by a dynamo weighing 41 oz. At the conclusion of an hour's run this little dynamo was run up for a few moments to an output of 20 volts 5 ampères!

The subject of dynamo lighting for motor cycles is one of enthralling interest, and a discussion of its advantages and disadvantages at this stage of its development would no doubt prove to be of some educative value both to the motor cycling public and also to those who will cater for its wants when the Hun has been subdued and energies are once more free for peaceful industries.

A. E. FUNNELL.

PETROL OR PARAFFIN.

Sir,—With reference to your readers' correspondence regarding running on paraffin, will the following be of any interest?

During most of the past winter my 4 h.p. countershaft Triumph has been running on pure paraffin. Starting is effected by a small pilot tank of petrol, connected up with the usual copper piping fitted into an ordinary Y piece used for generator tubing.

In cold, crisp weather and reasonably level country the machine hauls a medium weight cane Montgomery sidecar quite well—almost as well as on petrol, in fact there is rather more power, provided the "revs" are kept up.

In damp, muggy weather results are rather disappointing, but the machine is quite rideable, though under all conditions spark and air especially need careful handling. The consumption is, I should say, about 35 m.p.g., sometimes a good deal more, according to atmospheric conditions.

Care must, of course, be taken never to allow the engine to get cold while the float chamber is filled with paraffin, but one soon gets into the way of turning off paraffin a short distance—say a quarter of a mile—before stopping; then, at the first sign of "starving," turn on the petrol and stop. Altogether I am very well satisfied, considering that nothing has been added to the standard carburetter.

E. R. A. BERTOLACCI (Lt.), M.M.G.S.

SPARKING PLUG CONDENSATION.

Sir,—In answer to "Ixion's" further comments on this question, of course I did not intend to suggest that "switching-off" and swinging the engine would be of any use *after* the moisture had settled on the plug. It is not unusual in starting on a very cold day to crank the engine once or twice to free it a little, and if this is done with ignition switched on it is not surprising that the plugs should get "drowned out," but by switching-off during this preparatory cranking a large proportion of the contents of the cylinder would be swept out.

The formation of mist by an electric discharge is no theory, but a scientific fact, which formed the basis of the famous Cavendish experiment of determining the mass of an electron—now a matter of history.

Quite a good way of rendering the air in a closed vessel dust-free is to coat the walls of the vessel with oil or grease and allow the dust time to settle. This bears a close resemblance to the case of a motor cylinder, and the longer the temperature of the cylinder remains above dew-point the more dust will its oily walls extract from the gas it contains, and the less dust will there be to assist the formation of dew or mist. This explains the freedom of the air-cooled engine from this trouble.

I should think an oily engine, large radiator capacity, and very small throttle by-pass opening, would render a car more susceptible to this trouble.

P. C. KERSLAKE-SMITH.

PIONEER JOURNALISM.

Sir,—In your issue of March 1st, page 187, lower right-hand corner: "Pole shows the boat used to set traps on as an easy means on the water to drown the rats which dive under being caught." This paragraph is quite plain to a Canadian trapper. It refers to one of the many methods for setting the common steel trap to catch the "musk-rat,"—an animal about the size of a small house cat, and which is found in large numbers in the North Temperate Zone. The rats are caught for the fur, which is nearly all shipped to Europe for making up into commercial articles. The flesh at the proper time of the year is much esteemed by the natives as an article of food.

In the paragraph you publish, pole refers to any stick of dead timber 3in. or 4in. in diameter, which acts as a *float* to set trap on, and the word "float" should be substituted for "boat" as being more grammatical. This pole is supposed to be floating on water, where it would be impossible to stake or otherwise set the trap, and the musk-rats, being always found on water, will visit and climb out on the pole, and any piece of meat as bait will cause them unhesitatingly to climb on to the trap and get caught. Being caught, the rat's first instinct is to dive under the surface of the water (do you see the meaning of the word "under" in the formula?), and as one end of the trap chain is fast to the pole he cannot escape, and as the weight of the trap keeps him down he soon drowns. A proper rat-set requires that the rat shall soon drown himself, otherwise he will escape by gnawing off that portion of the foot below the jaws and pulling the leg through; there is no pain in this gnawing act, as it is upon that part of the leg numbed by the trap.

FRANK M. WOODS.

TAPPET ADJUSTMENT.

Sir,—I wonder if this will be of any use to some of your readers. I had a 1915 Douglas with which I was very satisfied till a most irritating trouble commenced. The symptoms were misfiring and a perpetual stream of vaporised gas being forced out of the air intake. First of all, I put this down to using substitutes, but I proved this theory wrong by tests on pure petrol, when exactly the same thing occurred. The whole trouble lay with the exhaust valve tappets, which I found had to be adjusted till practically touching the valve stem. The usual visiting card test did not hold good.

Hoping this will help anyone else in trouble,

Edinburgh. GLENCORSE.

COPPER CYLINDERS AND PISTONS.

Sir,—I have read "Ailette's" article on water-cooling, which appeared in your issue of March 15th, and I agree entirely with his views.

Most troubles in connection with motor cycle engines are traceable to the very imperfect cooling devices employed. No improvements have been made in these since the early days of motor cycling.

If, however, there are other means than water-cooling of reaching the same result without increasing weight and complications it would be well if they were stated. Copper has a high coefficient of conductivity and radiation; therefore we might hope to get very efficient cooling by making cylinders and pistons wholly of copper.

I know well, however, that cast or hammered copper is not suitable: the former because it is very spongy and the latter owing to the difficulties of manufacture. But electro-deposited copper is as compact as hammered, and it should be easy to make cylinders and pistons by this process.

I foresee that this procedure may be very advantageous from an industrial point of view. The exactness and delicacy with which the model is reproduced gives us ground to hope that it may be possible to minimise mechanical work; but whatever it may do in this respect, if the adoption of copper cylinders and pistons improves cooling as much as seems likely, even a reasonable increase of cost is to be accepted.

The fins of actual cylinders do not deserve the qualification "radiating." Very little radiation can take place between two plain surfaces as near as they are and equally hot: a stationary engine becomes rapidly overheated in spite of the so-called radiating fins. Really, the cylinders, when the cycle runs, are cooled only by the constant renewal of the air confined between the fins.

If the employment of copper proves favourable, this will depend upon the radiating qualities of such metal, and we must help these qualities. Instead of parallel and very near fins, we must fit wings in the direction of the radius. As these are divergent they do not hinder radiation so much as if parallel, and also they need not be so near one another, because the radiating power of copper does not require so great a cooling surface.

Moreover, the carbon deposits, which cause so much trouble nowadays, are undoubtedly due greatly to a kind of affinity between carbon and iron, and the deposit upon copper surfaces will be probably both less thick and less adherent.

Also the friction between copper and iron will be perhaps more favourable than when rings and cylinder walls are of the same material.

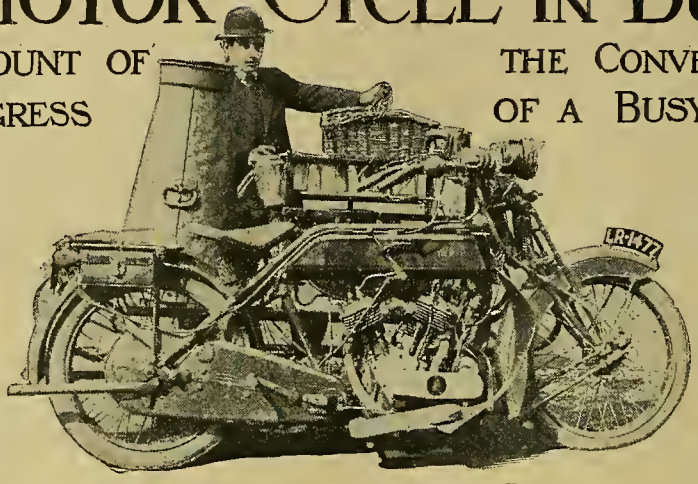
I cannot say whether the attempt would be a success or a failure in practice: at present I will only say why not try? E. MARIANI.

Madrid.

[*Owing to the large number of interesting letters received weekly, many have to be held over for want of space. Correspondents are therefore asked to be brief and to the point.*—Ed.]

THE MOTOR CYCLE IN BUSINESS

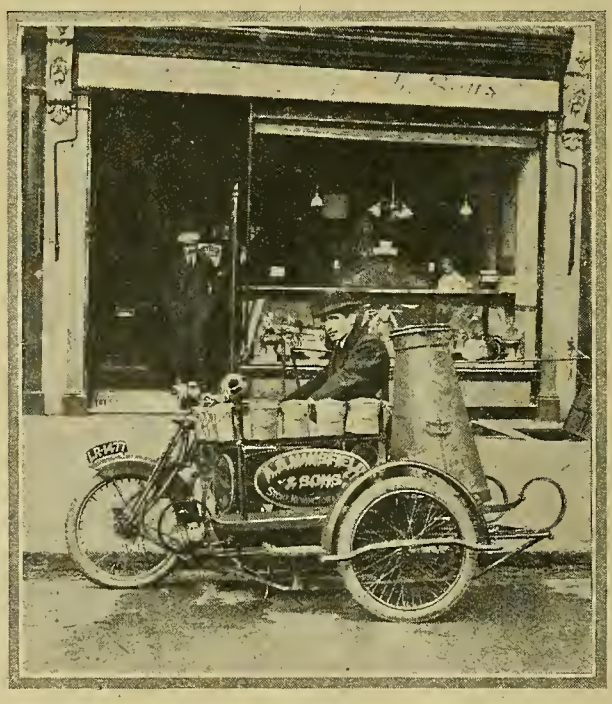
AN ACCOUNT OF THE CONVERSION AND PROGRESS OF A BUSY MAN



BY small steps, and very gradually, was I initiated into the handling of my double purpose big twin outfit. First I used a push cycle, then train and 'bus, auto-wheel, two-stroke, lightweight four-stroke, 3½ h.p. and sidecar, and finally 8 h.p. sidecar. Besides finding the latter ideal for business purposes, I have in it a perfect and fast passenger machine.

My work involves a good deal of travelling about London, between several depots and occasional journeys to farms and markets in Essex and Hertfordshire. On my ordinary push bicycle, which I used for several years, I covered some thousands of miles, mostly against time. I was eventually advised for health's sake to abandon the push cycle. Then I tried the train and 'bus but found these tiring, losing the advantage of all short cuts and frequently being delayed by missing connections.

Eventually I was attracted to the petrol engine in the form of an auto-wheel. This was a great help, and things went smoothly until I came off on several occasions on greasy roads in the City. Next I ventured on a Clyno two-stroke, which served me well for several thousand miles. My strong objection to that was the petroil system which ruined many suits, and also the nuisance of oiled plugs and choked carburetters. After various second-hand machines I eventually had a 2¾ h.p. Sunbeam. This was satisfactory in every way, and a splendid solo mount. I afterwards tried a sidecar with it, and naturally soon wished for more power, especially on hills and on a long journey. After disposing of the 2¾ h.p. I purchased the well-known 3½ h.p. of the same make, and this served me well. I could write a book on the pleasure my brother (now with the Tanks) and I had with it.



The sidecar in commission as a milk carrier. Note the substantial C springs fore and aft, and strengthened chassis.

On investing in an extra heavy family sidecar, which answered for business purposes also, we found more power desirable to avoid the change down on hills, etc. I then was lucky enough to secure my present mount—the 8 h.p. Sunbeam, J.A.P. engine. My first impression was of the fine reserve of power. It reminded me of a powerful horse that required holding back. With the throttle quarter open it maintains an easy, comfortable pace.

The next great improvement I noticed was the almost entire absence of vibration. With the 1915 3½ h.p., at 35 m.p.h. or over the handle-bar vibration was rather excessive, and one's feet were very often marking a ragtime on the footboards. Another blessing is the entire absence of wheel clogging, which I experienced with the other mounts when using them in extra bad weather and on country roads.

I remember on several occasions removing a front wheel to clear out the mudguard. With the W.D. model there is not the slightest sign of this; the only drawback is that one gets a trifle of mud on the machine and one's self from the rear wheel. Perhaps the guard could have been continued round for another inch or so; anyhow, a shield would cure it.

The extending of grease cups out through the spokes is a fine idea. One can now use a grease gun, and thus heavy grease is sent to the hubs and bearings. With an outfit used in all weathers and under bad conditions it is a splendid thing.

I think the new Dunlop steel-studded and rubber-bars back tyre far superior to several other similar makes I have used, in which the steel studs soon fall out, and when this starts the days of the tyre are numbered.

An Ideal Transmission.

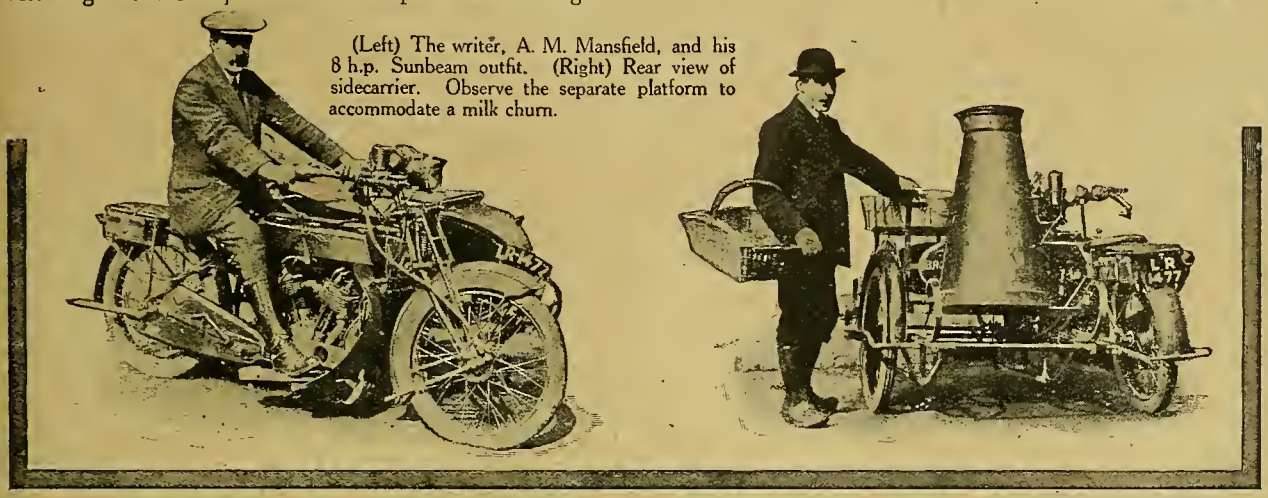
Another point with the 8 h.p. is the almost marvellous acceleration, without any sign of a jerk or knock.

The Motor Cycle in Business.—

For all weathers, I think the enclosed all-chain drive requires some beating, and I miss the tiresome belt slip I encountered several winters ago.

As to power, my wife and I, with three tins of petrol and luggage, and a heavy sidecar, leaving Clapton at 11 a.m., arrived at Grimsby at 7.30 p.m., allowing one and a quarter hours stop at Peterborough. On deserted roads we at times maintained fifty on the clock. On another occasion, starting at 2.30, we proceeded *via* Chigwell, etc., to Chelmsford, then on to Reddon to view the Zepp, stopped an hour, and reached home at 8.30, after covering 130 miles. This is a fair speed for a heavy sidecar outfit, and speaks well for the engine that can maintain it.

A.M.M.



(Left) The writer, A. M. Mansfield, and his 8 h.p. Sunbeam outfit. (Right) Rear view of sidecarrier. Observe the separate platform to accommodate a milk churn.

MOTOR CYCLISTS AND NATIONAL SERVICE.

A Further List of Openings for Mechanics and Drivers.

THE Motor Cycle, together with its allied journals, was placed at the disposal of the Director-General of National Service when he inaugurated his scheme of National Employment, with the object of obtaining recruits with a special knowledge of motor work. This offer was a continuation of *The Motor Cycle* recruiting scheme of 1914-5-6.

We append hereto a further list of vacancies now open to National Service volunteers with mechanical training or experience as motor drivers. Previous lists appeared in the issues April 12th and 19th. These lists are published at the request of the Employment Department of the Ministry of Labour, which, by arrangement with Mr. Neville Chamberlain's department, receives from employers of labour particulars of individual vacancies open to National Service volunteers.

Any reader competent to fulfil one of the positions should visit his nearest employment bureau, taking with him this journal and quoting the reference number shown. Again we repeat that men already engaged upon Government work may not apply.

M.T. 69.—Six Fitters; aeroplane work; 46½ hours per week, with about 20 hours overtime; men must have worked six years at their trade and be able to produce indentures or references covering this period: Government work.—Near Rochester.

M.T. 70.—One Toolmaker: first-class screw die work: very urgent Government work.—Leamington.

M.T. 71.—Six Toolmakers; 63 hours per week, and overtime.—London.

M.T. 72.—Six Gauge Makers; 63 hours per week, and overtime.—London.

M.T. 73.—Two Toolmakers; press tools and jigs; 52½ hours per week, and overtime.—London.

M.T. 74.—Four Tool Fitters, for tool jigs and gauges; 52½ hours day shifts and 55 hours night shifts.—Near Dumfries.

M.T. 75.—One Fitter, used to internal combustion engines; 56½ hours per week, and overtime; very urgent work.—Near Luton.

M.T. 77.—Six Motor Engine Fitters, able to erect engines complete and to do own setting of valves and magnetos: 54 hours per week, and overtime.—Kent.

M.T. 78.—Two Motor Fitters; garage experience; able to do engine adjustments: 54 hours per week, and overtime.—Kent.

M.T. 79.—Two Turners; aeroplane parts; used to very accurate work; able to use micrometer and vernier; 56 hours per week, and overtime; no Sunday work; Government work.—Sussex.

M.T. 80.—Ten Fitters; general engineering; aircraft works: 55 to 60 hours per week.—London.

M.T. 81.—Two Setters-up, for capstan work; very urgent Government work.—Warwickshire.

M.T. 82.—Four Turners; tools, jigs, and gauges; 52½ hours day shifts and 55 hours night shifts; good lodgings available; very urgent work.—Near Dumfries.

M.T. 83.—Four Turners, for six-throw crankshafts; 52½ hours day shifts and 55 hours night shifts; good lodgings available; very urgent work.—Near Dumfries.

M.T. 84.—Twelve Fitters; seaplane work; experienced in sheet metal work; 68 hours per week, including overtime.—Kent.

M.T. 85.—One Cycle Repairer, used to building wheels and overhauling speed gears.—Oldbury.

M.T. 86.—One Steam Lorry Driver; competent man, capable of executing minor repairs to engine, etc.; physically fit, and able to load and unload.—Frome.

M.T. 87.—One Driver for Steam Waggon, used to 5 ton steam waggon: 54 hours per week; able to do little running repairs.—Near Exeter.

M.T. 88.—Two Steam Waggon Drivers, one for 3 ton 10 cwt. Yorkshire steam waggon and one for 5 ton Foden; 56½ hours per week; very urgent Government work.—Huddersfield.

M.T. 89.—Two Steam Tractor Drivers (Clayton); experienced; for home-grown timber hauling; 54 hours per week; Government work.—Lincoln district.

M.T. 90.—Two Motor Lorry Drivers (petrol).—Warrington.

M.T. 91.—Two Petrol Motor Lorry Drivers; able to load and unload; 6.30 a.m. to 5 p.m.—Birmingham district.

M.T. 92.—One Motor Lorry Driver; experienced; 54 hours per week; Government work.—Burslem.

M.T. 93.—Two Motor Drivers; motor mail vans; able to do running repairs; 54 hours per week.—Burslem.

M.T. 94.—Six Toolmakers; aeroplane works; 52½ hours per week.—Surrey.

M.T. 95.—Fifteen Toolmakers; aircraft works; 50-hour week, and overtime.—Suffolk.

M.T. 96.—Three Turners; 53 hours per week; Government work.—Coventry.

M.T. 97.—Four Motor Mechanics, used to commercial vehicles; 53 hours day shifts, 63 hours night shifts.—Dewsbury.

M.T. 98.—Two Metal Turners, used to working to fine limits; 53 hours day shifts, 63 hours night shifts; Government work.—Dewsbury.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS, LTD.

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

The Best Gear Ratio.

(1.) What is the best gear ratio for an 8 h.p. J.A.P. and sidecar? Mine is 3½ to 1 top gear, and I do not know if it would be better if it were lower. I have a two-speed Nala gear. (2.) I am using Binks fuel and a 28 jet. What jet would you advise for an 8 h.p. J.A.P.?—J.P.

(1.) With a two-speed gear your top speed ratio should be lower for sidecar work, say 4¾ or 5 to 1. (2.) The jet you are using does not seem to be abnormally large, but there is no doubt that the engine would stand a smaller jet, and therefore you would economise in fuel.

Acetone as a Fuel.

I have a 3½ h.p. fixed engined Rudge. If I put neat paraffin in the tank and put a small quantity of acetone as well (a very highly volatile spirit which I can obtain in small quantities), would the motor bicycle go? If so, what quantity of acetone would I need to one gallon of paraffin? I have a hot air intake. I should use about one gallon of paraffin a week, and could get it (riding to a munition works). Is there anything to stop me doing so?—R.B.

We would recommend you not to attempt the use of acetone even in a diluted state. It is far more explosive than petrol, and any experiments might lead to serious mishap—this quite apart from the fact that acetone is taken over by the Ministry of Munitions. In the unlikely event of nothing more serious happening the spirit would probably ruin the paint on your machine. Paraffin or any other substitutes must be entered on the petrol licence in the same way as petrol.

The Storage of Petrol.

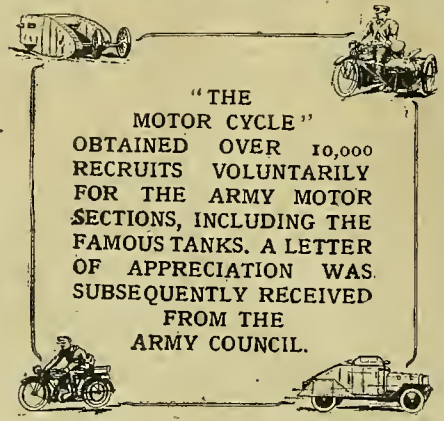
(1.) About storing petrol. I can now get a small supply from a friend who has paid the tax. Can I store about ten gallons? I propose digging a pit some distance from the house. (2.) I am riding a 3 h.p. twin with light sidecar. It is perfect as a solo mount, and will take small hills all right with the sidecar and passenger, but peters out on stiff ones. I am going to Winchester shortly, and know the road to Guildford. What is the Hog's Back hill like? (3.) Can you suggest an easier road than over the Hog's Back through Farnham and Alton? The combination will not go up River Hill, the other side of Sevenoaks. (4.) Is the Hog's Back as steep and long a hill as River Hill?—G.W.T.

(1.) You are allowed to store up to sixty gallons in two-gallon cans, provided it is stored in an outhouse *not* within twenty feet of any main building. (2.) The Hog's Back is in fair condition. There are a few bumpy stretches, but the surface has rather improved lately. The gradient is easy. (3.) The machine should certainly go up this hill, at any rate on low speed. There is a more winding road between Guildford and Farnham, namely, through Normandy and Aldershot. This keeps in the valley, and, of course, it is a much inferior road to the Hog's Back, at any rate from the scenery point of view. You could also go through Godalming, Milford, Elstead, and Charles Hill. (4.) The Hog's Back is not nearly so steep as River Hill, though it is about the same length.

Monster Motor Cycles.

I have read the following extract in the *Strand Magazine*, and should be glad if you would inform me if there has been such a high-powered motor cycle The extract runs as follows: "Almost as remarkable was the bicycle performance of Mr. A. E. Wills, on the Munich track on August 17th, 1908. He pedalled a machine geared to 163in. behind a high *32 h.p* motor cycle, steered by M. Bertin, the famous pacer, etc.—AUTO.

The pacing motor cycles referred to were specially constructed machines, fitted with a very large engine for the weight of the cycle parts, and it is quite possible that the engine was capable of producing about 30 h.p. Bertin was not the only man to use these monstrous machines for pacing purposes. Deemester, Cissac, Lanfranchi, and many others had special motor cycles constructed for pacing, and charged considerable fees for pacing professional cyclists who were out to capture the paced track records either here or on the Continent. The performances were undoubtedly sensational, but they served no purpose beyond proving what speed a cyclist could attain with a high gear when drawn along behind a pacing motor. These machines were quite unsuitable for use on the road, and were very difficult to handle and control until they got going. The driver-steersman occupied a seat directly over the centre of the rear wheel so that his body and legs offered the greatest protection to the follower on his pedal bicycle. Probably the biggest, but not necessarily the most powerful single track motor cycle constructed was the four-cylinder racing Clement or the eight-cylinder Curtiss.


"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

Overheating.

My engine is a 1911 4 h.p. single, and I use it for sidecar work. I find that this engine is liable to get very hot, even when carefully driven. (1.) Would it conduce to cooler running if I lowered the compression, and what thickness of plate (and of what material) should be interposed between crank case and cylinder? (2.) I have taken the engine completely down to renew the bearings. Will you kindly tell me of a book which deals simply and thoroughly with the balancing of motor cycle engines? (3.) I find that the main bearing (timing side) has worked loose from the crank case, though it is still a perfect fit on the timing shaft. Must I renew this bearing, or can I satisfactorily secure it by some means to crank case? (4.) I have been using a well worn two-lever B. and B. carburetter, but, in spite of attention to the usual sources of leakage, I cannot run slowly in free engine. Would a three-jet Binks be suitable for this engine, and could I run on pure paraffin?—NOVICE.

(1.) We should think that the compression of the engine might well be reduced. This could be done by fitting a copper or iron plate $\frac{1}{16}$in. thick between the cylinder and the crank case. (2.) There is a chapter on balancing in "Motor Cycles and How to Manage Them." (3.) No.; the bearing could be satisfactorily pinned. (4.) The fact that the carburetter is well worn accounts for your not being able to run slowly in free engine. This is probably due to air leaks caused by badly fitting carburetter slides. The Binks carburetter would be quite suitable, and you could run on pure paraffin after starting on petrol, provided you fit a suitable warming device.

Hot Air.

Would carrying hot air direct from the exhaust pipe to the carburetter be all right? Would the air be too hot, or would there be any danger of causing explosion in the carburetter?—W.H.O.

Hot air must not, of course, be conveyed from the interior of the exhaust. It should be taken from round the exhaust pipe, preferably through a muffle surrounding the pipe, as near to the cylinder as possible. There is no danger of the supply being *too* hot when heavy fuels are used—the hotter the better.

Drip Feed.

I have a Best and Lloyd drip feed pump attached to my machine. The needle is broken off, and I cannot remove the lower portion. Can you tell me if there should be a spring under these needles, or is it the pressure of the oil which keeps them in place?—A.S.H.

Pressure is obtained by means of a coil spring situated under the pump plunger. The needle is merely for controlling the supply passing from the pump through the sight feed glass to the engine. You will be able to recover the broken portion of the needle simply by unscrewing the gland nut through which it passes.

Running on Paraffin and Water.

I have just seen in an old copy of *The Motor Cycle* a letter from one rider stating that he could run his Triumph on a mixture of paraffin and water. I myself have a single-geared 1912 Triumph, and would be greatly obliged if you would let me know whether it is advisable to use this mixture, and, if so, in what proportions the paraffin and water should be mixed.—H.W.P.

Water must not be mixed with paraffin, but there is no doubt that the machine would run on paraffin, provided the fuel were adequately heated, and at the same time you could try a water injection in the cylinder, which might have the effect of preventing pre-ignition. This could be done by fitting a small auxiliary tank and connecting it to the compression tap, then allowing the water to drip very slowly into the cylinder. This has been carried out with some success by several riders.

The Choice of a Machine.

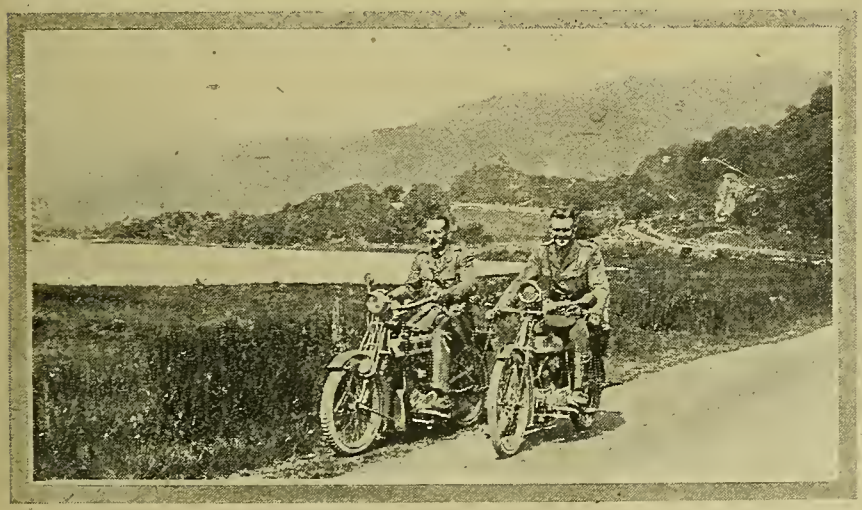
I should be grateful for a few hints on the choice of a motor cycle. My weight is about 9½ st., and I fancy a two-stroke lightweight would suit me. I am a complete novice, but I read *The Motor Cycle* regularly.—A.T.

Whether or not a two-stroke lightweight would suit you depends rather upon the nature of the country over which you will ride. Probably a two-speed lightweight of well-known make would be the safest investment for you. You would find a two-stroke lightweight easier to control and handle than a 3½ h.p. machine, and it would be quite fast enough for you, also capable of climbing any main road hill. Simplicity is perhaps the greatest point in its favour. After a time you could graduate to a machine of higher power.

Petrol Licence.

I should esteem it a favour if you would oblige by answering the following question: I sent my licence up to the Petrol Control Committee for a renewal, but have received an answer to the effect that it cannot renew the same, and as the committee has kept my licence, and I have noticed that we have to enter on our licence substitutes purchased, should I apply to the Petrol Control Committee for its return?—R.L.

We presume your petrol permit is used up, in which case it is of no further use to you. Substitutes have to be entered on the permit in the same way as petrol, *i.e.*, full duty to be paid on them. If your permit was not used up you should not have sent it to the Petrol Control Committee, and your best plan will be to explain your error and ask for the return of the licence.



Officers of an R.E. training centre spending their few leisure hours 'midst the beautiful scenery of "Snowdonia," North Wales. The photograph, sent by Lt. A. G. Guthrie, R.E., was taken on the Carnarvon road, and shows Enfield and A.J.S. motor cycles.

READER'S REPLY.

Firing on One Cylinder.

In amplification of your reply to "B.E.R.P. (*The Motor Cycle* of April 12th, Questions and Replies), I had similar trouble with my 2¾ h.p. W.D. Douglas, and solved it completely. I suspect that "B.E.R.P." will find the trouble confined entirely to the front cylinder, which, of course, can be easily proved by running for a few minutes and then feeling which cylinder is the hotter. I am used to making short journeys about Town, so you can imagine the regular annoyance of starting. Finally I traced my difficulty solely to overoiling on these short journeys. Nowadays I do not oil at all for short journeys, say, of five miles each, the theory being that the engine does not heat up enough to consume much oil. Both cylinders now fire immediately at all times. Of course, I am careful not to underdo the lubrication, but the front cylinder or misfiring at starting affords ample proof. On long journeys, however, as, for instance, a trip to Plymouth and back from London this Easter week-end, I lubricate copiously, and find perfect running and starting while warm. With the approach of summer, however, I suppose the engine will want a little oil for even the short journeys. I cannot explain why the front cylinder—or congealed oil on the plug it is really—is the sole trouble, but presume that the oil lead is rather on the large side. As you know, there is a specially drilled lead to the front. In conclusion, I should be interested to hear from "B.E.R.P." if this hint will solve his difficulty. If not, I should be pleased to run his machine (if he is in London) and try to overcome his trouble. I can only add that I am delighted with my Duggie, and will not look at any other make, although, let me hasten to say, I am just a private enthusiast unconnected in any way with the makers or the trade.—N. McCRIMMON.

RECOMMENDED ROUTES.

GILLINGHAM (KENT) TO CLEVEDON (SOM.)—F.P.

Gillingham, Chatham, Maidstone, Ightham, Riverhead, Westerham, Reigate, Dorking, Guildford, Farnham, Odiham, Basingstoke, Kingsclere, Newbury, Hungerford, Marlborough, Calne, Chippenham, Bath, Bristol, Clevedon.

WARSOP TO SUNDERLAND.—L.J.

Warsop, Worksop, Tickhill, Doncaster, Ferrybridge, Aberford, Wetherby, Boroughbridge, Thirsk, Yarm, Stockton, Castle Eden, Sunderland. Approximately 125 miles.

ROTHWELL TO DALE.—H.S.

Rothwell, Market Harborough, Rugby, Leamington, Warwick, Stratford-on-Avon, Alcester, Worcester, Bromyard, Leominster, Willersey, Hay, Three Cocks, Brecon, Llandovery, Llandilo, Carmarthen, St. Clears, Haverfordwest, Dale.

LUTON TO STAFFORD.—H.J.

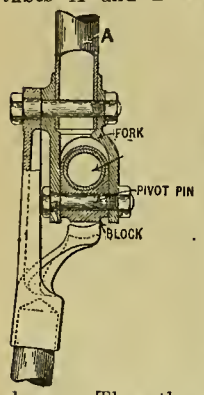
Luton, Dunstable, Hockliffe, Fenny Stratford, Stony Stratford, Weedon, Daventry, along Watling Street, through Atherstone to Weeford, after which turn right for Lichfield, Armitage, Rugeley, Stafford.

PATENTS

by Eric W. Walford

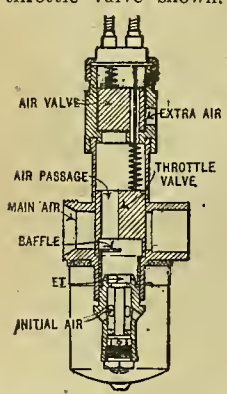
Pivotal Joints.

The construction illustrated is intended for use in the subsidiary joints of spring frames, and it is not suggested for application to the main joints, for which a more substantial construction is provided. In the example shown the two tubes A and B are to be pivoted together, and this is effected by providing the tube A with a fork which embraces a block on the tube B. The pivot pin comprises a bolt with a taper portion beneath the head which engages a taper hole in one side of the fork, the other end of the bolt being tapped to screw into the opposite side of the fork, and being locked in position by the nut shown. Thus the pivot pin becomes a fixture in the fork, and affords a large surface for the block carried by the tube B. Further, the sides of the block engage the fork, and, should any wear take place, this can be taken up by screwing up the pivot pin further, so as to draw the sides of the fork together, after which the pin is again locked by its nut. The drawing also illustrates the attachment of one side of the stand, which, however, forms no part of the invention.—W. Douglas, No. 104,582.



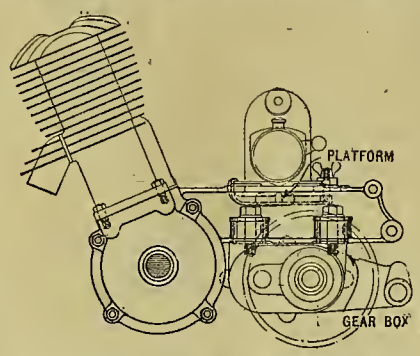
Carburetter Construction.

The carburetter body has a straight through passage which can be opened and closed both on the air inlet side and gas delivery side by the Bowden-operated throttle valve shown. The jet opening is arranged some little distance below the straight through passage, and the initial air supply enters through the holes shown below the level of the jet outlet. The throttle valve is cut away slightly on the delivery side, so that as it is opened up a supply of mixture passes to the engine before the main air supply commences. On further opening of the throttle valve both the air supply and the delivery are increased. An additional air supply is provided above the throttle valve, and this is controlled by a separate air valve, by which an adjustable quantity of air is allowed to enter the space above the throttle, and ultimately reach the engine through the passage drilled in the latter. There is also illustrated a baffle, which partially closes the opening above the jet on the air inlet side. It is rather difficult to see the objects aimed at in this construction, and the arrangement of the extra air supply above the throttle valve necessitates the carburetter being of considerable height.—E. Hutchinson, No. 104,568.



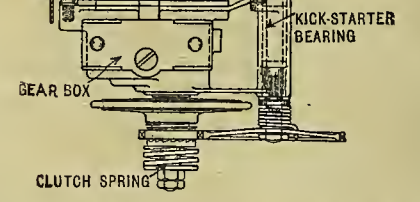
Unit Construction.

The practice of building up the engine and gear box as a unit appears to be receiving increased attention, and the drawings given herewith show a construction in which one-half of the crank case is cast integral with a double platform, to the lower part of which is bolted the gear box, whilst the upper part serves for the attachment of the magneto. The engine, gear box, and magneto therefore become a single unit, which may be attached to or removed from the frame intact. The magneto is attached to its platform by a quickly-detachable and adjustable means, a description of which recently appeared in these columns.—C. T. B. Sangster, No. 104,834.



A Gear Box, Clutch, and Kick-starter Unit.

The gear box casting is formed with arms, which support a long sleeve, providing a bearing for the kick starter spindle. This sleeve, together with a lug on the gear box itself, also serve for the attachment of a plate, on which is pivoted the lever operating the clutch. The three elements are thus incorporated in a single unit, which is adjustably mounted on a bracket provided on the machine.—C. T. B. Sangster, No. 104,642.



SPARKLETS

Repairs.

A. H. Hunt, 115, Cannon Street, London, E.C.4, informs us that he is able to undertake orders for small turned parts, milling, or capstan work, provided a Class A certificate is obtained.

A Rotax Depot Closed.

Owing to shortage of staff, the Rotax Motor Accessories Co., Ltd., inform us that they have been compelled to close their Manchester Depôt (29, Deansgate) temporarily. This, however, will be reopened immediately after the war. All correspondence, therefore, should be addressed to Rotax Works, Willesden Junction, London, N.W.

Scientific Welding.

Motor cyclists interested in acetylene welding should apply to Messrs. Barimar, Ltd., 10, Poland Street, London, W.1, for a copy of their brochure entitled "Scientific Welding," being a reprint from an illustrated article which appeared in *The Autocar* dealing with this interesting subject.

The "Homeland" Handbooks.

"Kingsbridge, Salcombe, and the Kingsbridge Estuary," the Homeland Association, Ltd., 37, Maiden Lane, London, W.C. 2. Another of the excellent Homeland series of handbooks which deals with one of the most charming districts of South Devon. Particular attention is directed to Chapter VI., which settles on indubitable authority, in the interests of literary accuracy, facts in connection with Tennyson's visiting Salcombe, and the composition of "Crossing the Bar."

P. and M. R.F.C. Model.

Messrs. Phelon and Moore, Ltd., Cleckheaton, the makers of the famous P. and M., have issued a spare parts list of their R.F.C. model, of which the firm may be justly proud. It is clearly indexed, and each part is listed and illustrated, the number appearing opposite each illustration and referring to the article depicted in the list of parts, opposite which in peace time there would be presumably a price for each article. The pages are slotted so that one can see at a glance the particular group of parts in which to find what is required. These are divided up as follow: Engine parts, silencer, gear and engine socket parts, brakes and foot-starter, carburetter controls and footrests, chain covers, frame and forks, spring forks, mudguard parts, wheels, tank and magneto, sidecar tools and chains. The list opens with instructions as to the ordering of parts, it being particularly impressed upon the motor cyclist that the engine number should be given in each case. Suppose a motor cyclist requires a front wheel spindle. He turns to the sub-division "Wheels," notes the illustration and the part number 318, then looks on the opposite page and finds that 318 is placed opposite the price.

ABINGDON "KING DICK"

MOTOR CYCLES AND ENGINES

Orders executed as the requirements of H.M. Government permit.

Abingdon Ecco, Ltd., Abingdon Works, Tyseley, Birmingham.

LONDON : G. H. SMITH, MORTIMER STREET, W.

The B. & B. CARBURETTER

HAVE YOU OBTAINED A COPY OF OUR LATEST BOOKLETS ?

"HINTS & TIPS" (which deals mainly with four-strokes).
"ALL ABOUT TWO-STROKES" (which no two-stroke rider can afford to be without).

WE SHALL BE HAPPY TO SEND YOU EITHER OR BOTH POST FREE ON APPLICATION.

BROWN & BARLOW, Ltd., Westwood Road, WITTON, BIRMINGHAM.

Bowden Wire Ltd.

BEING wholly engaged upon production for the British and Allied Governments, we are unable to execute any orders for private purposes until further notice. We have in stock certain goods suitable for replacements. Customers are invited to state their requirements in this respect, and, if possible, these will be met.

Established 1897.

London

Victoria Rd. Willesden Junction. N.W.10

Godbolds.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Spares; prompt delivery — Cyril Williams, Chapel Ash Depot, Wolverhampton. [1253

1916 4h.p. A.J.S., 3-speed, kick start, condition as new, Lucas lamps and horn, complete.—Pickering, Mardol, Shrewsbury. [X9219

A.J.S., 1914, 3½h.p., 3-speed, kick start, clutch, overhauled; £34.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

A.J.S. 1916 6h.p. Combination, fitted with head and tail lamps, speedometer, and horn, sidecar has hood and screen.—Hayes, 344, Euston Rd., N.W. [2055

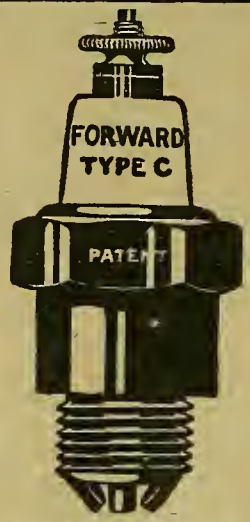
A.J.S., 1913, 2¾h.p., 3-speed, Lucas lamps, mechanical horn, spring seat-pillar, excellent condition; £30, or near offer.—18, Warley Rd., Edgbaston, Birmingham. [X9453

1915 2¾h.p. A.J.S., sporting model, 3 speeds, clutch, lamps, mechanical horn, Cowey, done 2,100, tyres perfect, spare valve, plug, extra tool boxes; £40, no offers.—Morrey, 26, Gatefield St., Crewe. [1903

A.J.S., 6h.p., late 1916 combination, spare wheel, everything complete, as new, done 1,350 miles, £20 extras, show receipts; called up; £108; petrol and oil in.—Harris, 54, Beck Rd., off Mare St., Hackney, N.E. [X9528

Alldays.

ALLON, 2¾h.p., 1915, good condition; £25.—75, Osborne Rd., Forest Gate. [1839



FORWARD

Plugs do not "live on the reputation of the reputation they might have made" — the foundation of their great popularity is the reputation that has been established firmly and solely on merit. That merit appeals to all its users, as it will to you.
Ask your Agent for details of our many models.

FORWARD MOTOR CO., 35, Forward Works, Summer Row, Birmingham.

Before your fastener fails, you can stop it—you can't after! See about it now—fit the FORWARD—the fasteners that *never* fail. They're kind to belts, too!

VEVO
THREE SPOUT INJECTOR
Polished and Plated.
No. 74.
Post Free, 3/3 Net.
VEVO
For injecting Grease and Heavy Oil into Gear Cases, Hubs, etc. A most useful article for all speed merchants.
Thousands are being supplied to the Government.
Vevo Works, PARK LANE, BIRMINGHAM.

MOTOR CYCLES FOR SALE.

Alldays.

1915 Allon, 2¾h.p., 2-speed, Seuspray, E.I.C.; 24 gns.—Railway Garage, Staines. [2052

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

1914 3½h.p. 2-speed Alldays Matchless, excellent condition; £30.—Parker and Son, St. Ives, Hunts. [1889

ALLONS, 1917 models actually in stock; exchauges, easy payments.—Geo. Smith, 268, Laveader Hill, close Clapham Junction Station. [1847

RUNS on Plain Paraffin.—1917 Allon de Luxe, 2-speed, clutch, kick start, spring frame, cost over £50, run 200 miles, 42 gns.; 1916 Allon, 2-speed, 29 gns.—Troward's, 78, High St., Hampstead. [1967

Antoine.

3½h.p. Antoine and Sidecar, Albion 2-speed and free engine, hub gear, in running order; what offers? —S. Braithwaite, 33, Burdett St., Bow, E. [1828

Ariel.

RIDER TROWARD'S, 78, High St., Hampstead.— 1913 Ariel, 3½h.p., variable gear; 17 gns. [1978

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

ARIEL, 3½h.p., 3-speed countershaft model, new Sept., 1916; £55.—Collinson, West Ayton, Scarborough. [X9476

ARIEL, 3½h.p., 1912, variable gear, free engine, do 60, lamps, perfect; £17/10.—194, Plaistow Rd., West Ham, E. [1799

ARIEL 1916 3½h.p. Countershaft 3-speed Combination, new condition, with £17 coachbuilt sidecar; £70.—Dodds, Bewdley Hill, Kidderminster. [X9454

ARIEL, 1912, 3½h.p., decompressor, adjustable pulley, semi T.T. bars, good tyres and belt, overhauled March, 1915, fast, in good running order, accessories; £20.—Gubbins, Swalcliffe Park, Banbury. [1809

ARIELS.—1917 5-6h.p. combinations and 3½h.p. combinations for immediate deliveries; cash, deferred, or exchanges with up-to-date machines, Douglas preferred.—Jones, Garage, Broadway, Muswell Hill. [2047

Auto-Wheels

AUTO-WHEELS.—Six in stock, all in running order, £5, £6/15, £8/10.—Geo. Smith, 268, Lavender Hill, Close Clapham Junction Station. 'Phone: Battersea 1271. [1851

Bat.

6h.p. Bat Combination, 1914, perfect condition, sporting model, J.A.P., overhead valves, countershaft, Binks, Empire sidecar, with enclosed chassis, flap, screen, carrier, etc., 3in. tyres, speedometer, accessories, 75 m.p.g.; any trial; £52.—21, R.F.C. Quarters, Lynchford Rd., South Farnboro'. [2040

Bradbury.

4h.p. Bradbury, 3-speed, complete, in perfect order; £23.—Stacey, 12, Ecclesall Rd., Sheffield. [2037

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage; £49/10.—Motor Exchange, Horton St., Halifax. [1856

RUNS on Neat Paraffin.—1913 Bradbury, 4h.p., 3-speed, perfect order, 24 gns.; sidecars to fit.—Troward's, 78, High St., Hompstead. [1979

1914 Bradbury Combination, 4h.p., 2-speed, handlebar clutch, Binks, lamps, etc., petrol; £39.—Newbatt, 10, St. James Av., Sutton. [1841

BRADBURY 4h.p., Multi geared, running on 75% paraffin, good condition; offer wanted.—A. G. Watson, Steam Laundry, Abbey Wood. [1819

1913 Bradbury, 4h.p., 2-speed N.S.U. gear, with Montgomery wicker sidecar; £18.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0497

BRADBURY, 4h.p., N.S.U. 2-speed, free engine, wicker sidecar, complete with lamps, horn, speedometer; £22.—Herbert, 42, Bristol Rd., Gloucester. [X9462

B.S.A.

COLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A., 1915 Model K, nice condition, £48; sidecar, £3.—Nicholson, Butcher, Barking. [1876

1914 B.S.A. Combination, good tyres; £27, immediate cash.—163, Loughborough Rd., S.W. [1948

B.S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888

1914 T.T. B.S.A., put by for 18 months, lamps, horn, knee grips; £27/10.—A. L. Pitts, Reddich. [X9515

1914 4½h.p. 3-speed B.S.A. Combination; 50 gns., or exchange 3h.p. twin and cash.—Box L3,558, c/o *The Motor Cycle*. [2050

1915 B.S.A., chain drive, Millford coachbuilt sidecar, just overhauled, lamps, tools, owner ridden; any trial; £60.—The Bungalow, Drove Rd., Biggleswade, Bedfordshire. [X9239

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

Advertising and Publishing Offices:
20, Tudor Street, London, E.C.4.
Telegrams: "Cyclist, Fleet, London."
Telephone: 2848 City (five lines).

Editorial Offices:
Hertford Street, Coventry.
Telegrams: "Motorcycle, Coventry."
Telephone: 10 Coventry (five lines).

Northern Offices:
199, Deansgate, Manchester.
Telegrams: "Iliffe, Manchester."
Telephone: 620 City.

Subscription Rates: Home, 10s. 10d.; all countries abroad, 15s. 2d. per annum.

COLONIAL AND FOREIGN AGENTS:
UNITED STATES—The International News Agency, New York. CANADA—Toronto News Co., Ltd., Toronto; Montreal News Co., Ltd., Montreal; Winnipeg News Co., Winnipeg; British Columbia News Co., Vancouver; Gordon & Gotch, Ltd., 132, Bay Street, Toronto.
AUSTRALIA—Gordon & Gotch, Ltd., Melbourne (Victoria), Sydney (N.S.W.), Brisbane (Queensland), Adelaide (S.A.), Perth (W.A.), and Launceston (Tasmania).
NEW ZEALAND—Gordon & Gotch, Ltd., Wellington, Auckland, Christchurch, and Dunedin INDIA—A. H. Wheeler & Co., Bombay, Allahabad, and Calcutta.
SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

Age for Driving Licences.

ONE of those extraordinary cases which come to light occasionally occurred at the Blackburn City Court last week. In peace time, when a great deal of motoring is being done, there is frequent evidence that police court authorities are not so well versed in the law as they should be, but it is some time since we had occasion to draw attention to a ruling such as the present one. Last week a fourteen-year-old boy, whose father is in business in Blackburn as a motor dealer, was proceeded against for "riding a motor cycle with sidecar whilst under seventeen years of age." The Superintendent of Police, who prosecuted, contended that the sidecar outfit was a motor car and classed as such. The defence argued that the sidecar did not come under the definition of a motor car, and, even if it did, the lad was in possession of a licence, issued by a person in authority, entitling him to drive a motor car. The Clerk of the Court said that by reason of the age of the youth he was disqualified from holding a licence to drive a motor car.

As everyone knows, the minimum age for a licence holder to drive a motor cycle is fourteen, whereas seventeen is the minimum age for car drivers. The wording of the Act is as follows:

> "Any person under the age of seventeen years shall be disqualified for obtaining a licence (except that a licence limited to driving motor cycles may be granted to a person over the age of fourteen years), and any person who already holds a licence shall be disqualified for obtaining another licence while the licence so held by him is in force."

Notwithstanding these facts, the magistrates upheld the contention of the superintendent, and imposed a fine of ten shillings. We observe that the formal declaration of the decision was adjourned in order to give the defending solicitor an opportunity of communicating with the Automobile Association with a view to the lodging of an appeal.

No doubt after much further time has been wasted, considerable expense incurred, and the A.A. brought into the net, it will be possible to prove to these magistrates something they ought to have known before taking their seats on the bench. Obviously, if the ruling of the magistrates in question be upheld, then a car licence must be paid for the sidecar. It must, too, carry numbers as large as those on a motor car, and the rear number must be illuminated. Furthermore (and this is important in war time), the owner will be entitled to the car allowance of petrol!

What is the True Petrol Position?

WE remarked last week upon the absurd statements constantly repeated in the daily press on the subject of petrol supplies. These journals never point out that in two months this year we imported 25,259,724 gallons of petrol, compared with 14,507,656 gallons during the same period of 1916, or an increase of 10,752,068 gallons.

Of course, as we made quite clear in our last issue, these opinions are what is known as playing to the gallery, for any motoring which takes place nowadays is officially sanctioned. No man may obtain petrol without a permit, and permits are only obtainable from the official body, the Petrol Control Committee, and then only after careful consideration. We think it is high time that the authorities put some check upon this empty talk about the drastic measures which are always "shortly to be introduced." This is no concern of the public; it is entirely a matter for a Government Department. If the need be pressing, then by all means check the issue of permits. Correspondents tell us that they have been astounded to receive "offers" of petrol from the Petrol Control Committee. In two particular cases we know that ten gallons per month have been offered in place of the old allowance of four gallons per month. This shows that the position is not quite so bad as the ill-informed daily papers would have their readers believe.

An index to the advertisements in this issue will be found on the page facing the back cover.

THE A.J.S. RUSSIAN MODEL.

AMONG the illustrated descriptions of Russian military models which have appeared in recent issues, it will be recalled that the 6 h.p. A.J.S. was reviewed. In detailing the departures in design, we stated that the frame has a horizontal top tube, which is not actually the case, for it declines rearwards as in the standard design, the tank being "saddled" over this tube to give it a large capacity—as a matter of fact, it accommodates approximately two and a half gallons of spirit. The two lower portions of the tank are connected by a pipe at the rear end. The A.J.S. was one of the first firms to standardise the straight top tube, and has a natural objection to any departure from an approved design.

Another item on the Russian model, to which we did not draw attention, but which is certainly worthy of a reference, is the improved method of actuating the clutch. In place of the perpendicular arm below the casing, the clutch is now actuated by a bell crank lever, neatly covered in, almost at the top of the casing, and which is operated by a Bowden wire. This system is not only to be preferred on account of its cleanliness, but has also effected an increased ground clearance.

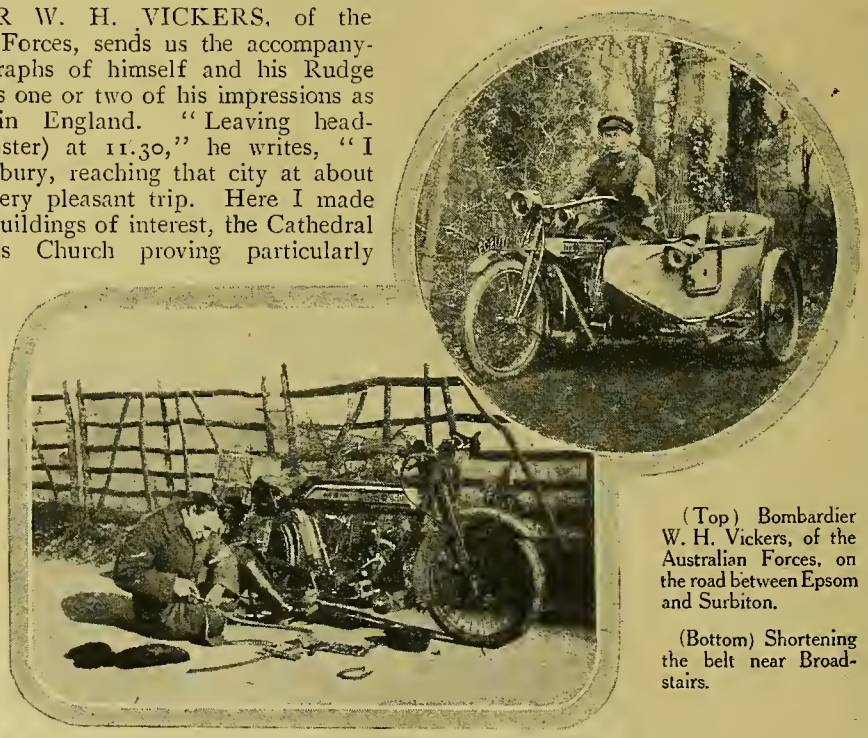
A ROUND TOUR ON A RUDGE.

An Australian's Impressions of British Roads.

BOMBARDIER W. H. VICKERS, of the Australian Forces, sends us the accompanying photographs of himself and his Rudge machine, and gives one or two of his impressions as regards touring in England. "Leaving headquarters (Westminster) at 11.30," he writes, "I started for Canterbury, reaching that city at about 3 p.m., after a very pleasant trip. Here I made a tour of the old buildings of interest, the Cathedral and St. Martin's Church proving particularly well worth a visit, and on Sunday morning I started off on a round trip *via* Margate, Ramsgate, Sandwich, and Folkestone, returning by Ashford, Maidstone, Sevenoaks, and through Croydon — approximately 260 miles.

"I have been riding a Rudge-Multi for eighteen months, and had no trouble whatever (of course belt troubles do not count). Your fine English roads, after our poor country roads in Australia, make motoring worth while. I would not fancy doing a week-end trip of this mileage out there. My first mount was a two-speed two-stroke, but this soon got the kick-out. I do not fancy the type will become very popular among speed-mongers.

"The photograph with side-car was taken on the road between Epsom and Surbiton, Surrey."



(Top) Bombardier W. H. Vickers, of the Australian Forces, on the road between Epsom and Surbiton.

(Bottom) Shortening the belt near Broadstairs.

MAKING A JOINT.

How Air-tight and Oil-tight Joints can be made Permanent.

A GREAT many four-stroke engines leak oil between the cylinder flange and the crank case owing to an imperfect or carelessly made joint, while in the case of a two-stroke it is vitally necessary that all joints be perfect, otherwise difficulty in starting and irregular running are bound to occur.

It is thoroughly worth while when taking down an engine for the first time to make a permanent job of all the joints, so that no further trouble will be experienced with them during the term of one's possession. Decide upon some good stiff fibrous jointing material, guaranteed to stand heat, and of the desired thickness (if too thick it can generally be divided after warming). Lay the material on the joint to be made, and tap lightly with a hammer in the ordinary way, so that a distinct imprint is made; then carefully cut out the joint with a sharp penknife.

Seccotine is now smeared over the face of the material which is to lie against the metal from which the studs protrude, and the joint pulled home in the ordinary way. The seccotine sticks the joint permanently to the bottom face, and when the cylinder is removed it remains there, stuck to the crank case, so that it cannot be torn or damaged by dragging it over the threads of the holding-down bolts.

Occasional Comments by "Ixion"

Front Chain Adjustment.

MANUFACTURERS know well that they cannot fully trust a certain type of user to keep his chains in alignment when he adjusts them. I do not think anybody has ever evolved a rear wheel which inevitably kept its sprocket in alignment with the gear box sprocket, though the task should not be insuperable; and in any case a slight error here is of comparatively little account, because the chain is long. Moreover, it is easy to sit behind the back tyre and get a lining squint along the chain. The front chain, being short, suffers more from running out of line, and is less easily tested. Wherefore many wise designers take steps to ensure alignment by mounting the gear box in an eccentric, by carrying it in longitudinal slides, or by threading its hanging bolts in narrow slots. Now that spring frames are booming there is not as much room in the region of the bottom bracket as there used to be. Part of the available space is often taken up by the hinging spindle of the rear chain stays, and makers show a tendency to mount the gear box immovably, and to use a slidable engine for adjusting the front chain. I have nothing to say against this principle, but I have a good deal to say against such applications of it as permit a duffer to get his engine out of line. A short chain, running askew, does not make for good, and the chain guard or chain case gets horribly in the way of a conscientious owner who likes his chain to be true.

A Petrol Hotchpotch.

MY May 1st permit is numbered well under the 100,000, and the numbering appears to run on consecutively with those of last November. If so, the wildest critic can hardly contend that many joy-riders survive. I, personally, have been treated in the most businesslike way by this much-abused body. On each occasion I have stated tersely how much petrol I want, and why I consider myself entitled to it. In both cases a reply, enclosing a demand for tax, has come practically by return, and the pink card has followed in a day or two after the receipt of my cheque. But the various referees—or whatever they call the officials who make the decisions—have not yet adopted a uniform policy. Here are two curious cases: Two men, employed by a Government department, have been sent by the authorities to do Government work at short distances from their homes—say five miles and ten miles away respectively. In each case there was no tram, train, tube, or 'bus. Each man bought a motor bicycle. The ten-mile man is married, and naturally desires to live at home; he is refused fuel. The five-mile man is a bachelor, and could easily change his lodgings; he is given fuel. Two other men, engaged in food production, both used a motor (car and cycle respectively) for combined business and pleasure purposes before petrol restrictions commenced. The car owner pitched a good yarn when licensing began, and got such a lavish allowance that he is now 200 gallons in hand! The bicycle owner had a few gallons in hand when the permits loomed ahead, and, as he could do his market journeys on about two gallons a month, did not apply for a permit until now. He is refused!

The Joys of the Road.

DRY roads again at last. Overhead a sun that is warm without being sultry. Underneath me a perfectly tuned spring frame 3½ h.p. In my pocket a pink permit for enough fuel to see me through the next six months. Ahead of me one of the finest speed stretches in England, followed by some sporting hills and some gorgeous scenery. Inside me the consciousness that the journey is on national service. Then a whirring above, and one of our hideous little R.N.A.S. "blimps" fusses past. Submarines, torpedoes, the blood-soaked fields of Flanders, and a thousand nameless horrors loom up in the mind. Memory recalls good men and true who rode that route with me four brief years ago, and who will not ride again. For the present generation motor cycling can never again be all it used to be, and some of us will hardly have the heart to face another trial or Tourist Trophy. We shall miss more old faces than we shall welcome; and those whom we shall welcome may not fully atone for the absence of those we shall miss.

Sauce for the Goose.

AT the very moment when sundry enthusiasts in our columns are agitating for water-cooled motor cycle engines, other enthusiasts in our dear old granny, *The Autocar*, are thundering away for air-cooled engines for motor cars. Finally, Mr. Parnacott creates confusion worse confounded by reminding us that all engines are really air-cooled, only some of them (quite absurdly) employ water as an intermediary agent. The lid will be on when some ex-motor cyclist airman adds that it is absurd to use the term "air-cooling" of any speeds less than 150 m.p.h., or of any altitude below 10,000 feet, or of any temperature above 60° minus; and that silly little motor cycles creeping about on our warm earth ought really to be described as phug or phroust-cooled (I never know whether to spell those good schoolboy words for a cosy atmosphere with "f" or "ph"). In the meantime, to avoid misconception, let me say that where two-wheelers are concerned, the kind of cylinder that has light cast iron fins protruding concentrically is good enough for me; and let me chip Mr. Parnacott, whose main point is that water-cooling was a nuisance last winter, by reminding him that air-cooling will be a nuisance to many people this summer! That's the worst of the Temperate Zone. If we lived at Aden we should all have a weakness for water-cooling; if in Greenland air-cooling would do. But when fate has stuck one down in a climate which is Aden and Greenland by turns designers are always in the soup. (By the way, I wasn't thinking of Mr. Parnacott, *bien entendu*, when I scribbled the heading of this par.)

MORE SPORTING REMINISCENCES

by VETERAN

(Being the Sixth Instalment of the Series.)

(Previous articles appeared in our issues of April 13th, June 15th, Sept. 14th, Dec. 21st, 1916, and March 1st, 1917.)

THIS instalment is to consist exclusively of tales of woe. Those experiences of trouble which most crushed one at the time of their happening make poor yarns, because they consist chiefly of exasperating series of petty mishaps, the culminating effect of which almost drives one mad. For example, a six days trial in which one's belt is always slipping, one's plugs always fouling through piston ring slots lining up, one's tyres puncturing on every short control, and so on, contains no picturesque incident, but yet may bring one almost to the doors of the asylum. My chronicle must therefore rather consist of isolated incidents containing some salient feature.

A Modern Don Quixote.

Chief among them all stands out the trade loan of a prehistoric machine, embodying a rear wheel clutch, so designed that the back wheel spindle revolved in plain bearings mounted in the rear forks. These bearings seized up so that neither paraffin, heat, nor force would free the spindle. The machine could neither be wheeled nor driven, and I eventually carried it to a station. One of my minor yarns has a happier ending than most tales of trouble, though it hardly redounds to my credit. A very trusty machine of abnormal power turned sulky one morning in a Scottish six days, and refused to exceed 20 m.p.h. I jogged along for half a day, saving my gold by quarter seconds at more than one control, and sorely puzzled to know what was amiss. In the luncheon interval I decided that the magneto timing must have slipped. I rounded the corner past the hotel, and dug the mud away from the engine to find that the contact breaker had rusted in the full retard position, though the handle-bar lever posed as fully advanced!

Another story with a gleeful ending has reference to a certain crack hill-climb. I had readied rather a warm engine, and entered it in three classes. The day turned out very wet, and the hill was so tortuous and dangerous that the event was put off till the following Saturday. Unwilling to spoil the tune of my engine by riding it home again, I covenanted with a farmer to keep it locked up all week in a barn near the farm. Arriving about 11 a.m. the following Saturday, I discovered to my chagrin that the roof of the barn leaked; my machine was red rusty, and in anything but the mood to go; in fact, the magneto was sodden. After trying various remedies I finally detached the magneto bodily, baked it dry in the farmer's oven, and won three firsts up the hill between 2 p.m. and 4 p.m.

Sometimes machines rise to the occasion and falsify one's cynical forebodings. Halfway through a six days trial I got hold of some bad oil about five miles from the night hotel, it being my wise practice to fill up on the road late each afternoon to avoid the free fight for funnels and cans next morning. The aforesaid oil soon got in its deadly work on the big end, and when I paused just outside the hotel for minimum time to elapse, I realised my big end was on the verge of seizing. There was perhaps five minutes difference between minimum and maximum time, and I utilised the whole of that period to work oil into the bush; but, as I handed over the machine to the marshals, I knew that big end would be immovable by morning. It is hard to drink and jest with a merry crowd, knowing that one must conquer a seized big end in thirty minutes at 6 a.m. next day or lose one's gold. However, at 6 a.m. I was at the official garage with a gallon of paraffin, and for half an hour I might have been seen perambulating that yard, aided by a motley assortment of waiters, ostlers, boot boys, and friendly officials, labouring to free that big end, with the crank case jamful of paraffin. 6.30 a.m. struck—starting time—and a faint creaking noise in the bowels of the engine was the only portent of success. By this time I was in a semi-fainting condition; however I duly clocked out, aided by my retinue of henchmen, and in another ten minutes we got the engine loose. We were on the parade of a famous watering place; there were several thousand people assembled to see the trial off; golly, did not those paraffin fumes scatter the crowd! Incredible as it may seem, that battered big end survived the trial. I got my gold, and, what is more, I rode 150 miles home on the machine, and did 55 m.p.h. with it on the Great North Road, as a certain officer in France will testify; eke he will bear witness that, in the effort to free that big end, we ripped the tips off the timing wheel pinions, and the flywheels battered those tips against the inside of

More Sporting Reminiscences.—

the crank case, and carved a lovely scollop pattern all over the aluminium.

An "Infernal" Gear.

The same watering place found me driving a small car in an automobile trial a few years later—a trade car, if you please. On the first day one of the rods in the selector mechanism of the gear box buckled, never having been hardened. This made gear changing a matter of considerable time and uncertainty. The conditions were that we lost our gold medals if our road wheels stopped once without the observer's permission. When I saw a hill looming up, I commenced my terrific struggle to get across the gate into bottom gear; and for three days I always got my gear in, though more than once I was almost on the 1 in 5 bits before the lever shifted. Similarly on reaching the top of the hill I had to stay in bottom gear till the car reached a long falling grade; for a gear change might occupy four miles in distance and twenty minutes in time; and if the wheels once stopped all was lost. I covered miles and miles on the bottom gear of that infernal contraption, and I was really grateful when the gear box finally collapsed on the fourth day.

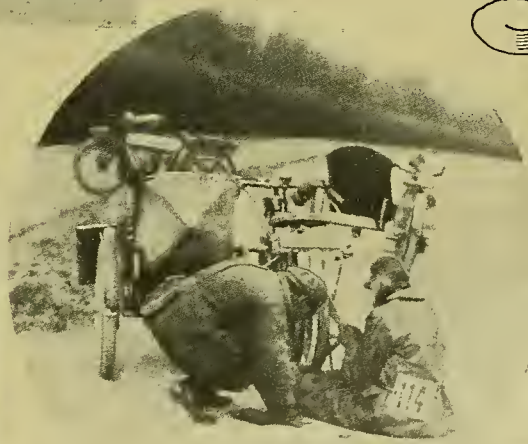
The last yarn is not a true tragedy, which, according to Aristotle, should arouse both pity and fear in the audience; the next tale is a genuine tragedy. It also happened on a car: motor cyclists —saving your presence, gentlemen —do not know what real trouble is. The rear hub brakes were weak and greasy to the point of futility, as not infrequently happens on cars; but still I drove on, knowing that the propeller-shaft brake was of unparalleled tenacity. Descending an unknown hill, I became intimidated by the vista ahead, which suggested both corners and precipices, so I gently applied the hand brake. Nothing doing! I pulled it hard on. Still nothing doing! Brain wave, —a pin must surely have dropped out of the connections.

Second brain wave. Accelerate engine violently, bang in second gear. Then shut throttle and slow car down. Accelerate again to the limit; bang in bottom gear, shut throttle, slow car; live to be hung after all. I grasped the gear lever and stamped a No. 11 boot on the accelerator. Got second gear in all right —hurrah! Shut throttle, and joyfully waited for car to slow! Nothing doing—car gathers speed if anything. Propeller-shaft evidently out of action. I sit tight, steer like Resta on Snaefell hairpin, and stare round for something soft to fall on. Mercifully the hill is clear, and I reach level ground in safety.

On Pleasure Bent.

The next incident may strike you as a comedy. Its elements are simple. Scene, a lonely Scottish moor at 1 a.m. Author on pleasure bent. Bitterly cold. Pouring with rain. Ten miles from anywhere. Engine stops firing after a splutter or two. Author anathematises that plug. Dismounts. Opens toolbag. Light-fingered gentleman at last hotel garage has annexed toolkit. Sole weapon on machine or person is a magneto spanner, and spark-

TRIAL TROUBLES



"Oft expectation fails, and most oft there Where most it promises."—*Shakespeare* ("All's Well that Ends Well").

More Sporting Reminiscences.—

ing plug is hopelessly carboned up and irremovable. The brain wave was a trifle sluggish, but two hours later I extracted that plug with a spanner improvised out of a piece of wood with a penknife.

I recall another case of a rained-out magneto—in a Scottish trial. The magneto was of the obsolete, unprotected sort, and the rain was true Scots rain; it simply flooded the armature. Experts will be aware that the curing of a rained-out magneto demands shelter, and the sole shelter for miles was a roomy fowlhouse, full of fowls and guano. I got that magneto to the point of developing a feeble and irregular spark in half an hour or so, and had to trust to the friction of running to dry out the rest of the damp; my gold was long since forfeited. Picture the pandemonium that ensued among those fowls when at last the reluctant engine started up. They flew round and round in volplanés and loops and things, and covered me with spiders and cobwebs and guano.

The "Whirlwind Jones."

For a change my mind turns to happier things. Years ago there was a certain run in which it was—quite unofficially—rather the thing to finish as near first as one could, though the judges did not appreciate finishing position, so long as time was all right. Jones and I were both riding, let us say, 7 h.p. Whirlwinds. Jones's engine was very hot stuff, mine rather less so. We were some five miles from the end of the trial, and there was nobody near us except Brown, who bestrode a 7 h.p. Blizzard. We had tried a few dust-ups, with the disquieting result that Brown proved to have the legs of me, while Jones could leave either of us. But whereas Jones and I knew the road, Brown did not. Now it would plainly be a great thing for the Whirlwind Co. if they could advertise that their machines came in first and second; but Brown evidently had second place in his pocket for Blizzards, Ltd. I signalled Jones, who dropped back to exchange ideas with me. Then Jones flung the throttle open, and went for Brown, while I brought up the rear warily. Jones passed Brown in the course of a mile, and instantly turned down a promising-looking side road off the official route, whilst I—well to the rear, mind you—kept straight on towards X——. I kept on, not too fast, but not too slowly; and just as the finish hove in sight, I heard a tremendous rattle of engines astern. I looked back long enough to make sure Jones had got a nice little lead of Brown, and toddled up towards the checker-in. Jones and I registered in, equal first, with Brown a good third, two hundred yards astern. I don't know whether Brown ever tumbled to this very dirty trick we played him; if he reads this, perhaps he will remember and forgive?

Nights Out.

Ever slept out? used to be the question hardened motorists asked each other in the pioneer days. I was one of the lucky ones, and seldom made my bed in a ditch, or under the lea of a hedge. But, none the less, I know which birds wake first. Once, caught in a dip between two steep hills with a quad, of which the bottom gear had melted. Once, with a Crestmobile 3½ h.p. spider car, when the remnants of three American chains, riveted up together, failed to produce the equivalent of two chains. Once, lost on Dartmoor after using all my carbide in lighting tyre repairs for a Judas who dropped me in unknown lanes as soon as I had got him going. Once, with a bent exhaust valve, which refused to be extricated. Once, with a tricar, which melted the shellac in its coil, which was foolishly stored in a natty little mahogany case bolted to the red hot radiator. Once, with a tricar which had a slipping clutch, and fearsome hills ahead and astern. Once, when my one and only belt broke so often that its ends failed to meet by two inches, even though I inserted every fastener I had. More than once, with variegated tyre troubles, on several sorts and sizes of motor vehicles. Once through my tappets eating the humps off my cams, till they ceased to be even mildly eccentric; and doubtless on other occasions long since forgotten.

So, at the risk of being termed an old fossil, I now tell the bloods that motoring isn't what it used to be. You get on, you go off, you get there, and you come back again—all without any important mishap; and the only yarn you can spin at the end of it all is that you touched 65 m.p.h. or 120 m.p.g. Pish! If only our stupid War Office thought me fit to tackle D.R. work through Ypres under shell fire, I might resuscitate a few vanished sensations.

SIMPLIFYING THE TWO-STROKE.

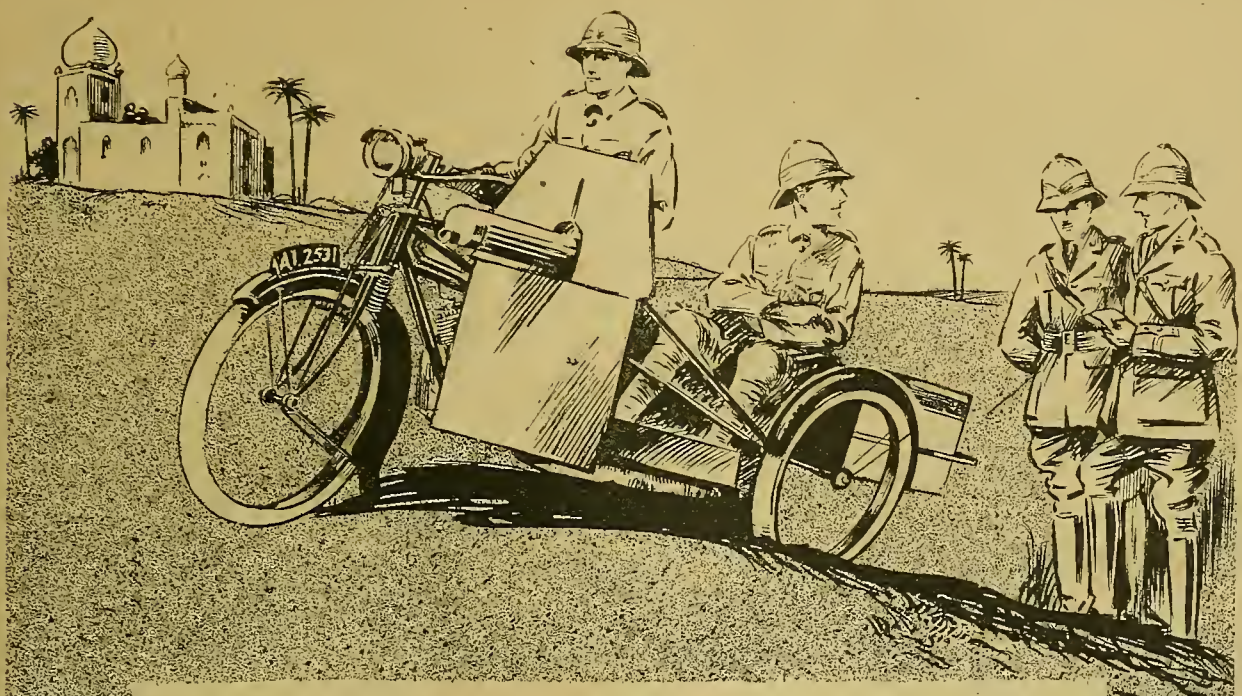
The Employment of Integral Units.

REVIEWING the well-known two-stroke power units of to-day, one is struck by the uniformity of compactness and neatness exemplified by the leading makes, but there is something very attractive in the system, already adopted in the States, of combining the entire mechanism of this type of machine in one integral unit—that is, the engine, oil sump, gear box, and magneto forming one base, and attached to the frame by two points of suspension.

The advantage is that the unit—engine, gear box, magneto, and reduction gear—all but the final drive, is a unit braced in itself. As an integral casting it is slung under the frame at the apices of the triangular structures of the latter, so that all strains are met at the points of the frame triangles instead of being thrown about haphazard, imposing various intermediate stresses which call for heavy frames in order to overcome the inaccuracies of design.

By means of the complete unit system, the entire mechanism of the machine can be dropped from the scientifically designed triangular frame simply by loosening off two bolts at the lugs that support the unit. The Americans are to be commended for slapping a new theory into practice; it remains with us to appreciate their methods and improve thereon. The complete unit system is one worth while following, for it promises the lightweight of the future—based on the principle of simplicity and the absence of adjustable and exposed parts.

CHINOOK.



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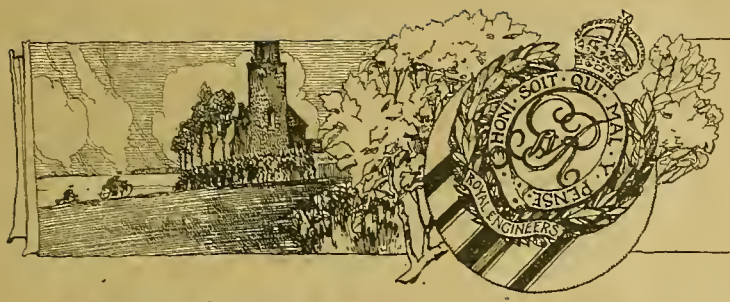


MILITARY NOTES.

A MEMBER OF THE STAFF WOUNDED.

WE regret to learn that S. A. M. Whitham, who was for a short period a member of *The Motor Cycle* staff, and is a despatch rider attached to the A.S.C., M.T., has been wounded during the course of his duties. Whitham was carrying despatches along a road which the Germans were bombarding with violence, when he was injured in the back by shrapnel. He is at present in hospital at Sunderland, is quite cheerful, and is waiting to undergo the X-rays treatment for the second time. A letter to his parents from the Adjutant of his section states that when wounded Whitham's first thoughts were not for himself, but for the safety of his despatches.

DESPATCH RIDERS AT POONA.

THE photograph of four despatch riders seen sitting on a 3½ h.p. Ariel at Poona, India, was sent us by Despatch Rider G. W. Peter Jackson. The names of the men on the machine from left to right are D.R.'s Yond, Light, Ressel, and Challice.

The Ariel machine shown is one of a batch attached to the Depot. The motor cyclists are shortly to depart on service, so our informant says, and some further remarks contained in his letter are appended :

"I have noticed various snaps reproduced in your paper from time to time of Egypt, B.E. Africa, France, and other places, but none from India. Hence my sending this snap, hoping it will be good enough to reproduce.

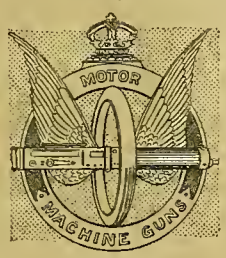
Despatch riders stationed at Poona, India, astride an Ariel 3½ h.p. motor cycle. Reading from left to right, they are Cpls. Yond, Light, Ressel, and Challice.

"I must say your paper is very much appreciated, for I no sooner get it than all the Bungalow want to borrow it, so much excellent advice and tips does it contain, apart from the very bright and helpful articles which appear from time to time.

"Of course, you may know, we do brigade D.R. duties, apart from the training we receive from very capable officers and N.C.O.'s."

A DISTINCTIVE BADGE.

IT appears that mounted troops, and also the Canadian Motor Machine Gunners, have a distinctive badge of their own. Some members of the Motor Machine Gun Service are rather anxious that they, too, should have a special badge, indicating in some way the character of their work. Two of the motor cyclists of this section have gone so far as to submit to us a suggested design—which has been re-drawn and is produced herewith — and seek our advice. Though we are not in possession of orders on the subject, we should have imagined that unofficial badges of the kind would not be permissible, and we should strongly advise our correspondents to broach the matter to their Commanding Officer.



A distinctive badge for the Motor Machine Gun Service, a design suggested by two old members of the M.M.G.S.

So far as the design is concerned, we consider it attractive and extremely appropriate. The writers conclude their letter as follows :

"At present we have the M.G.C. badge, and although we are not allowed to wear our original badge (from which the M.G.C. badge was created) some of us keep it as a souvenir of the grand times we had at Bisley.

"Other members of our service we invite to give their opinions, knowing well that the old hands were very loth to break off the lettering of their old badges.

"We wish the 'Blue Cover' the best of success, and hope to see a big issue of post-war models very soon."—Gnr. F. ATKINSON and Scout R. F. EMERSON, M.M.G.S.

MOTOR CYCLISTS IN INDIA.

THE Editor has received another communication from Sgt. A. Fielder, who will be known to many motor cyclists as a former employee of the New Hudson Cycle Co., Ltd. Segt. Fielder is with a motor machine gun battery at present stationed in India. The photograph reproduced, showing a Clyno sidecar outfit, was enclosed with his letter, and, in passing, the propeller mascot attached to the buttress of the spring fork is not without interest. Sgt. Fielder says :

Sgts. A. Fielder and Barton aboard a Clyno outfit. The aeroplane propeller mascot, writes Sgt. Fielder, has been through a good many trials at home.

"I went to Calcutta for Christmas on leave, and had quite an enjoyable time, as the people round there seem to delight in giving the boys in khaki as good a time as possible. By the way, I met Cpl. Sproston down there on sick leave, which was a great surprise, as I thought he was still in Mesopotamia. I am enclosing a photograph of myself with Sgt. Barton in the sidecar."

OVERSEAS SECTION.

A Commentary based upon Practical Experience and a Study of Overseas Opinions.

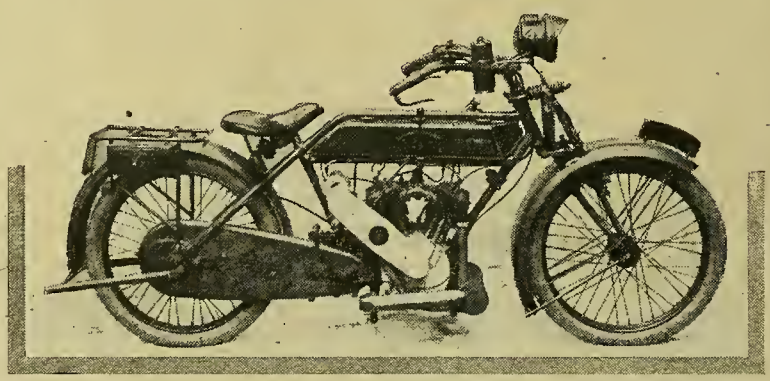
Welcome to a New Ally. SINCE our last Overseas issue went to press another strong foe has joined the Allies to conflict Germany by land and water. It must have been a very severe blow to the pride of Kaiserdom when America broke off diplomatic relationship—kicked Germany out, as it were, from the circle of civilised society—and those who consider that President Wilson was perhaps a little late in showing his hand must keep before them the full facts of the case.

It has always been the policy of the great republic of the West to avoid diplomatic entanglements with European affairs, and the wisdom of such a policy is doubtless beyond reproach. Then again, America was in a very curious position with regard to going to war with a Teutonic race, and above all one must not lose sight of the enormous help America has rendered the Allies, both in material and financial credit, since the very outbreak of war.

Now, however, that the States are rubbing shoulders with us, many things are to be discussed, foremost among which looms our trade policy of the future. On page 370, last week's issue of *The Motor Cycle*, we dealt briefly with the matter of fixing a tariff for Allied nations on a preferential basis, the tariff to be decided in each case by the period at which the nation concerned entered the war.

Every broad-minded American will, we feel sure, realise the justice of this suggested basis. It is safe speculation that when the war ends America will be in a sound condition commercially and financially, whereas France, Italy, and Belgium, the only nations that have ever appeared as serious competitors in the world's motor industry, have already suffered the hardships and losses of bloody invasion.

It is, perhaps, early to discuss such matters, but the time must not find us unprepared in our policy. America is now one of us, and it is merely a matter of adjusting things fairly and proportionately for all concerned. We do not know what part America is to play, and though it is inconceivable that she will suffer the perils and losses that her Allies have suffered, it is by no means conceivable that her share towards the realisation of a victorious peace will be small. An American motor cycle is now an Allied motor cycle!



A TYPICAL OVERSEAS MODEL.

The Sunbeam 8 h.p. Russian military mount for sidecar use. Special features, which should appeal to the Colonial are the exceptional ground clearance, 28in. × 3in. tyres, the entirely enclosed drive, and the detachable wheels The engine is 85·5 × 85 mm. = 976 c.c.

♔ ♔ ♔

The Past Month. "COMBINED Valves," "Internal Cooling," "The Advantages of Large Valves," and interesting discussions on the sizes of motor cycle wheels, form but a few of the good things we have placed before our readers during the past month. What are the opinions of the Overseas reader with regard to the Ackerman spring wheel—not as a substitute for the spring frame or the pneumatic tyre, but merely as an adjunct to act in conjunction with both?

A wheel which is to function as a spring is, for obvious reasons, beyond expectations, but there is no visible reason why a "shock absorbing" wheel, permitting just sufficient yield to damp out jar and vibration, should not some day supersede the rigid wheel. Probably the designers of spring wheels in the past have been too ambitious.

♔ ♔ ♔

British Manufacture. IT must not for one moment be imagined that British manufacturers of motor cycles are rusting up or running to seed during these days of shell production, for, quite apart from the requirements of our own armies, every factory of note in the land is now producing veritable ship loads of machines for an Allied Government. In this issue we give particulars of yet another high-powered twin solo mount from a leading factory, and though certain details in its design must not be taken as permanent—being, apparently, whimsicalities of choice limited to a few—it is certainly an appetising morsel for those who love a big engine, perfect control, and —reliability.

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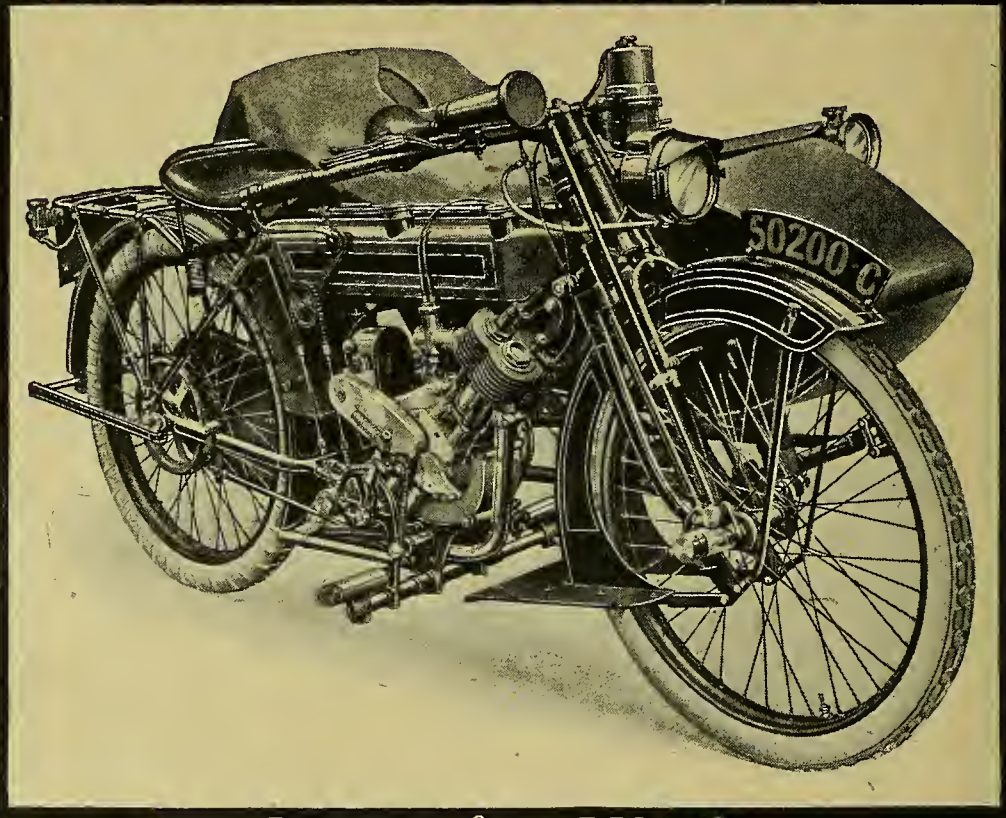
KEMPSHALLS
IN THE GREAT WAR



Message No. 1.

"THE BIGGEST SURPRISE I have had is the Kempshall Tyre. Although only known to me by name in pre-war days, it has proved itself (out of the many varieties I have used) TO BE THE BEST OF THE LOT, other Tyres having given up the Ghost in a day or two."

G. W. TAPLIN,
"Motor Cycle," March 9th, 1917.

THE KEMPSHALL TYRE CO. (of Europe), Ltd.
97-98, Long Acre, W.C.; Cambridge Street Rubber Works, Manchester; also at 200, Deansgate, Manchester.
Telephone—244 Gerrard (2 lines). Tel. Address—"Studless, London."

C.D.C.

A Selection of Letters from Readers scattered all over the World.

British Single versus American Twin.

MR. R. WILLIAMS, Saltley, Birmingham: "I have noticed with interest the Overseas opinions so often published in your valuable weekly referring to defects in the design of English machines. For over seven years I rode a popular 3½ h.p. single in Queensland, Australia, and never had the slightest trouble with the engine. However, after riding some of the American motor cycles, I am convinced the 3½ h.p. single possessed drawbacks for Australian use, viz., badly-sprung front forks, rigid rear frame, and belt drive. The American machines are selling very well in Queensland, and they certainly have more points of advantage in design for rough country riding than the English machines. I trust the English makers will soon incorporate in their motor cycle designs the features which now induce the majority of Australian buyers to go in for American machines."

Handicapping Overseas Production.

13334, DRIVER J. B. WESTWOOD, an Australian, now at Salisbury Plain, writes: "As regards the manufacture of motor cycles in Australia, the production is considerably hindered by British manufacturers of motor cycle engines, who permit a few of the leading firms in Australia to control the sole agency for their engines. In Melbourne a fair number of machines are built up and turned out very satisfactorily, but in Sydney, my home, very few are built, owing to the cost. On several occasions I have built machines in Australia, but I could have produced them at a much lower cost had it been possible to purchase the engine direct from the makers. As it was I had to purchase from agents, whose profit added considerably to the ultimate price of the machine, but on writing to the British manufacturers I was always referred to an agent.

"Surely a small order is as important as a large one. We all try to climb the ladder to increased business, but if we are prevented in this way from getting a footing on the first rung, how can we climb?"

Petrol Consumption in Africa.

W. E. COURTNEY (Vice-captain E.L.M.C.C.), East London, South Africa, writes:

"I am sending you a photograph of W. Innis, winner of the petrol consumption test held recently (16th December, 1916) under the auspices of the East London M.C.C.

"W. Innis did the fifty-six miles over hilly country on 64 oz. of petrol, averaging 140 miles to the gallon, which is, I should think, a record for South Africa. Mr. Innis's motor cycle is a 1913 3½ h.p. Triumph, which has done a tremendous amount of work. Second, C. Morris, riding a fixed engine 4 h.p. Triumph; his average was 114 m.p.g. Third, E. Warneke (Rover), 101 m.p.g. Fourth, W. E. Courtney (war model 4 h.p. Triumph), 97 m.p.g.

"This competition was run under proper M.C. rules, with three or four competent judges."

W. Innis, on his 3½ h.p. Triumph, who averaged 140 m.p.g. in a recent South African trial. (See letter.)

An Australian's Conception of an Ideal Mount.

MR. A. H. TATE, Kurrajong, New South Wales, writes:

"Having been a reader of your journal for some time, and seeing other opinions of motor cyclists, I am just stating what I think would be a suitable machine for the Colonies for solo riding.

"ENGINE.—3½ h.p. opposed twin. Overhead valves. Plenty of room between flywheel and magneto. Adjustable big-end bearings.

"GEARS, ETC.—Three-speed, countershaft. Adjustable pulley of large diameter, and good clutch.

"TRANSMISSION.—Chain-cum-belt; chain to be substantial.

"WHEELS.—28in. diameter; tyres 28in. × 3in.

"MUDGUARDS.—Giving plenty of clearance between tyre and guard.

"FRAME.—Loop pattern, with front and rear springing, springs to be very stiff; 6in. ground clearance, semi T.T. bars, foot rests, tool bag on tank, two good brakes.

"CARBURETTER.—Well out of the way in case of a fall—as is not the case in most opposed twins.

"A good set of tools, including spare valves, etc.

"This is my idea of a suitable mount. What we want is one that will stand the rough roads and keep in good tune for a considerable time. The American machines are getting a great hold here—Harley-Davidson and Indians. The price of the American tempts many a buyer. I have been riding a 2¾ h.p. Douglas for the last three years. It is a good bicycle, but not enough horse power. The frame and forks want a little attention. The small chain is about the greatest trouble—wears out under 2,000 miles."

A Reader who gets Good Results from Crude Kerosene.

From MR. ROBERT BROOKS, Bengal, India:

"It may now be rather late to refer to correspondence of interest in *The Motor Cycle* of December 21st, 1916, just to hand over here, but no matter how late, always interesting.

"In this number what please me best are the letters on 'Will the Single-cylinder Survive?' and 'Petrol Substitutes.' With us here in Calcutta petrol, with late taxation, has reached the limit—2s. 2d. per gallon.

"My machine is a 1914 Wolf, 4 h.p. J.A.P. single-cylinder, Senspray carburetter, with coach-built sidecar attached. Looking round for a petrol substitute, I took a small quantity of common American brand of kerosene, which had been used in our tool store for cleaning machines and tools, so dirty that it could not be seen through! After injecting a few drops of petrol into the cylinder, the engine started up well, and ran well on the stand. The next move was to drain the tank dry, and put in exactly one gallon of this same kerosene, with the intention of running till dry. The supply lasted three days—mileage roughly 25, 45, and 13, with ten stone passenger and a full tin of petrol in the sidecar.

"The total mileage was 83.8, at average speed of 20 m.p.h. on gear of 6 to 1. The engine does not heat up so much as on petrol, which gives only 65 m.p.g. The only alteration to the carburetter is an air scoop I fitted on the intake, to help to keep the engine cool while using petrol. The machine has done 1,500 miles since last cleaning out, and lately I touched a speed of 42 m.p.h., with sidecar, on petrol.

"Tyres and belts are our greatest troubles out here."

SPEED RECORDS IN AMERICA.

A REMARKABLE feat of fast riding and endurance was recently put up on the Los Angeles track by a Harley-Davidson rider, Allen Bedell. Starting at six o'clock in the evening, Bedell set out with the object of breaking the 24 hours' world's record, and, though the night was foggy, he managed to maintain a speed of 46 m.p.h. throughout the darkness. At break of day this speed was quickly increased, and the full 24 hours was run out without incident—the enormous distance of 1,153½ miles being covered.

Bedell is stated to have been astride an ordinary touring machine, which makes his feat all the more remarkable. He has beaten the previous 24 hours' record—which was established by Baker, in Australia, on an Indian—by 125 miles, and the 1,000 miles record by 21m.

CURRENT CHAT

TIMES TO LIGHT LAMPS.

SUMMER TIME.

May	3rd	... ...	8.54 p.m.
,,	5th	... ...	8.57 ,,
,,	7th	... ...	8.59 ,,
,,	9th	... ...	9.2 ,,

Advice for Two-strokists.

Do not over-oil your two-stroke. Do not take it down for decarbonisation till you are positively certain such a step is necessary.

Saddles and Comfort.

The comfort of a good lightweight can be spoilt by the employment of a cheap saddle, and it is to be feared that many makers of the "economy mount" attempt to economise in this direction. It is false economy, for so much of the rider's judgment is ruled by the saddle on which he is mounted.

Military Machines after the War.

A correspondent suggests, with regard to disposing of the enormous number of military motor cycles after the war, that soldiers be given some opportunity of purchasing these machines when the time comes—*i.e.*, that, if the machines are to be disposed of at dump lot prices, the man in khaki should be given preference. The suggestion is a good one, but the surplus would not be worth much when Tommy had finished picking the goods over.

Petroleum "Pool."

We stated a few weeks ago that a pooling of the distribution facilities of the petroleum companies in this country was likely to come about. It has now been definitely decided to carry this into effect at the Government's request; at the same time the tonnage of the various companies will be pooled with a like object of effecting economy. All products, except lubricating oils, hitherto delivered under proprietary brands, will in future be delivered under war brands, and distributed under the authority of the Pool Board.

A Much-summoned Man.

An unusual case was heard recently at Plumstead, where a motor cyclist was summoned on four separate charges: (1.) For exceeding the 20 m.p.h. speed limit. (2.) For driving without a licence. (3.) For fraudulently using a wrong motor cycle number. (4.) Using an unregistered motor cycle. The defendant, who pleaded guilty, said he had had a puncture, and was hurrying to get home. The other offences were committed partly through ignorance of the law and partly through inadvertence. Fines amounting to 70s. were imposed.

Weight, and the Future.

In a few years time when our engines are composed entirely of aluminium, the present era will probably be referred to as "the days of the old iron engine." Awful brutes! Weighed about a ton!

A First Conviction.

A reader sends us a cutting from the *Weekly Irish Times*, which shows that the authorities in Ireland are keeping a strict watch on the legal use of petrol. At Kilcullen a motorist was fined £4 for having illegally used for a motor car or motor cycle motor spirit which had been obtained for industrial purposes. This, to the best of our knowledge, is the first conviction.

Modern Timing.

A genius of the Emerald Isle who uses his small two-stroke for "catching" the business train between Rugby and Coventry in the morning, and who has missed the service regularly three times a week since the clocks were advanced, wonders whether advancing his magneto one-twelfth of a turn would assist matters. It rather depends whether the magneto runs clockwise or anti-clockwise.

The Motor Ski-cycle.

The uses of the Auto-ped are spreading in America. The golf caddy now employs a motor scooter, and, of course, butcher boys had them long ago. Still another use for the Auto-ped is as a tender to a large car in case of breakdown. The Auto-ped is mounted on suitable brackets arranged on the footboard, and in case of a derangement or tyre trouble the chauffeur mounts the scooter and hurries off to summon help.

SPECIAL FEATURES.

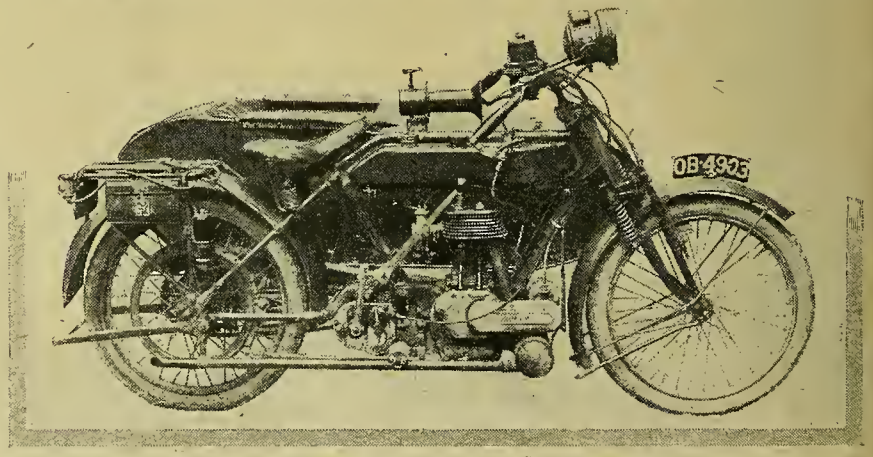
OVERSEAS NOTES AND VIEWS.
RUSSIAN MILITARY MODELS.
MORE SPORTING REMINISCENCES.

Speed Again.

Recently a member of our staff visited a charity cinema show. The object of the "driver" of the lantern was apparently to rattle off film after film at T.T. speed, but midway the apparatus failed—owing to the overheating of the central electrode of the sparking plug the reader of this week's "Critics" would naturally conclude.

An Uncommon Cause of Fire.

We have received a letter from a seventeen-year-old reader, A. E. Thompson, of East Molesey, Surrey, describing a curious cause of fire which has led to the total destruction of his 1¾ h.p. Zenith. He writes that he was filling the tank with petrol when "a flash of lightning came and set the petrol on fire." The machine was standing in a shed the door of which was open. Thompson states that he was not smoking, but it seems rather strange that the lightning should strike the machine without knocking him down. Ignition might have been caused by static electricity, and if the petrol was being poured through a wash-leather, which is not stated, the fire might easily be accounted for. Thompson says that the machine can be seen any time at his home, but an examination of the remains is not likely to cast any light on the possible cause of the fire.



An all-chain-driven 4 h.p. Norton sidecar which is used by a Russian Army inspector of motor cycles on his rounds of the factories. This three-speed mount is an example of hundreds being manufactured for the Russian Army.

T.T. Winner Married.

On Tuesday last week, Mr. Cyril Pullin, who won the Senior Tourist Trophy Race in 1914 on a 3½ h.p. Rudge-Multi, was married to Miss Daisy Strong. Three well-known motor cyclists, Messrs. Gordon L. Fletcher, S. L. Bailey (Douglas), and A. H. Lakeman, were present at the wedding. Cyril Pullin is now engaged on important Government work. We wish him and his bride every happiness.

A Preferential Tariff.

The Imperial War Cabinet has unanimously accepted the principle that each part of the Empire, having due regard to the interests of our Allies, shall give specially favourable treatment and facilities to the produce and manufactures of other parts of the Empire. There is no intention of making any change during the war. This announcement was made in the House of Commons by Mr. Bonar Law.

Is a Sidecar a Motor Car?

A fourteen-year-old boy has been summoned and fined at Blackburn for driving a motor cycle and sidecar. The enlightened magistrates of this city upheld the opinion of the police superintendent, that the motor cycle and sidecar was a motor car. We deal with the matter editorially. Perhaps when the A.A. has been called in the magistrates will reverse their decision.

Identification Marks—Important Notice.

The Commissioner of Police desires us to draw attention to the great disregard by motorists of the provisions of the Motor Car (Registration and Licensing) Order which deals with identification marks. The object of the Order is to make a motor car easily identifiable when in motion, that it is thwarted by the practice of having marks which are improperly affixed, of improper dimensions and patterns, and often illegible and partly concealed. In 1916 ten persons were fatally injured in the Metropolis by motor vehicles which did not stop, and were never traced, and similar cases have occurred during the present year. Instructions are about to be given to the police to enforce the Order more strictly, but before doing so the Commissioner wishes to intimate the fact to motor users, in order that irregularities may be at once rectified.

A Daily Wail—No More Joy Riding!

The *Daily Mail*, May 1st, contains a passage bearing the above heading, and the sub-title, "The Motorist's Farewell to the Road." "This is a sad May Day for motorists," says the paragraph. "The new petrol restrictions come into operation to-day: petrol will henceforth be unobtainable for private and pleasure motorists. . . The rake of the road, the assertive motor cycle with its sidecar, came out on Sunday for its last jaunt until an unknown day." How sad! But we recollect that, about fourteen years ago, our worthy contemporary attempted a prophecy of another nature—the early death of the motor cycle. Yet the assertive motor cycle has had the audacity to live on, affording not only the cheapest means of travel, but proving invaluable as an instrument of war.

The Russian Royal Ruby.

In this issue we describe and illustrate still another Russian Army motor cycle, viz., the 5 h.p. twin Sunbeam—an entirely new type. Yet another British-made motor cycle ordered for the use of our Russian Ally is the Royal Ruby, the Manchester works of which company have been busily engaged for weeks past producing the machines ordered. It is the rigid-framed mount which is being used—not the new spring frame model we reviewed last year—and the engine is the twin J.A.P., a make which easily outnumbers any other on these Russian orders. The Russian Royal Ruby is on standard lines with countershaft gear and chain transmission, with extra ground clearance to conform to the specification laid down by the Army authorities.

Average Prices.

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the figures for the preceding five weeks. Thus the general trend of the market is visible at a glance, though many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.J.S.	1916	6 combination	£108	£96
"	1914	6 combination	—	£59
"	1916	4 combination	—	£87
Allon	1916	2¾ 2-speed	—	£33
"	1914	2¾ 2-speed	£30	£27
Ariel	1915	3½ 3-speed	—	£45
"	1914	5-6 combination	—	£55
Bat	1914	6 3-speed	£52	£46
Bradbury	1914	4 2-sp. sidecar	£39	£44
Brough	1916	3½ 2-speed	—	£57
B.S.A.	1916	4½ sidecar	£63	£61
"	1915	4½ sidecar	£55	£56
Calthorpe	1916	2½ 2-speed	—	£35
"	1915	2¾ 2-speed	£24	£29
"	1916	2½ 2-stroke	—	£23
Chater-Lea	1913	8 combination	—	£35
Clyno	1915	2½ 2-stroke	—	£28
"	1914	6 combination	—	£65
Connaught	1915	2¾ 2-str., single-sp.	£17	—
Douglas	1916	2¾ T.T.	£48	£47
"	1915	2¾ 2-speed	£41	£46
"	1914	2¾ 2-speed	£34	£36
Enfield	1916	6 combination	£82	£76
"	1916	3 2-speed	£42	£46
H.-Davidson	1916	7 combination	£90	£82
"	1915	7 combination	£63	£68
Henderson	1916	7 combination	—	£100
Humber	1915	6 combination	—	£65
Indian	1916	5 combination	£60	£65
"	1915	5 combination	£60	£56
"	1916	7-9 combination	—	£88
"	1915	7-9 combination	—	£70
James	1916	4½ combination	—	£67
"	1916	2-sp., 2-stroke	—	£30
Lea-Francis	1915	3½ 2-speed	£42	—
Levis	1916	2¼ Popular	—	£24
"	1915	2¼ Popular	£20	£20
Matchless	1915	7 combination	—	£73
New Hudson	1916	2-stroke, 2-speed	—	£28
"	1915	4 combination	—	£48
Norton	1916	3½ 2-speed	—	£47
"	1915	3½ T.T.	£48	£44
P. & M.	1915	3½ combination	—	£65
"	1914	3½ combination	—	£55
Premier	1915	2½ 3-speed	—	£28
"	1914	3½ 3-speed	£45	£46
Rover	1916	3½ 3-speed	£48	£50
"	1915	3½ 3-speed	—	£41
Royal Ruby	1916	2¾ 2-stroke	£28	£30
Rudge	1916	3½ Multi	£42	£45
"	1915	3½ Multi	—	£40
Scott	1916	3¼ combination	—	£60
Sunbeam	1916	8 combination	—	£110
"	1916	3½ solo	£85	£72
"	1915	3½ combination	£80	£77
Triumph	1916	2-sp., 2-stroke	—	£39
"	1915	4 countershaft	—	£53
"	1915	2-speed, 2-stroke	£36	—
Zenith	1915	8 Gradua	—	£62

The National War Funds.

At the week-end the principal war funds stood as follow:

The National Relief Fund (distributed £3,582,551)	£6,105,326	0	0
British Red Cross Fund	6,543,374	6	5
Tobacco Fund	128,835	0	0

"Minute Men."

The name chosen for the American volunteer military motor cycle companies, which it is proposed to organise in all parts of the country, is "The Motor Cycle Minute Men of America."

Roller Bearing Hubs.

Our frequent references of late to the design of hubs for motor cycles, particularly in relation to their mud-excluding properties, have directed attention to an important accessory. This week we describe and illustrate a hub with Timken roller bearings as used on the James motor cycle. Roller-bearing hubs are expensive but exceedingly satisfactory in use.

BRITISH IMPORTS AND EXPORTS FOR MARCH.

THE Board of Trade returns for March were again issued late. A point of interest in the import figures is that four times the quantity of tyres, parts, and accessories were imported as was the case for the corresponding month last year. A rather curious thing is that the reverse occurs with car tyres and accessories, three times the quantity being imported in March, 1916, as in the same month this year. Only one motor cycle was imported in March this year (by the way, its value is given as £12) against 107 in March last year.

IMPORTS FOR MARCH.

	1915.	1916.	1917.
Number of motor cycles	63	107	1
	£	£	£
Value of motor cycles	2,480	4,209	12
Parts, tyres, accessories, and other parts	9,857	10,321	44,228
	£12,337	£14,530	£44,240

EXPORTS FOR MARCH.

The number of motor cycles exported in March was 103 less than was exported last year, but this year's value was in excess by £777.

	1915.	1916.	1917.
Number of motor cycles	770	1,093	988
	£	£	£
Value of motor cycles	32,636	49,305	50,082
Parts, tyres, accessories, and other parts	25,132	31,023	28,768
	£57,768	£80,328	£78,850

It will be noticed that our exports compare favourably with last year's figures, especially when the shipping situation is considered; and with 1915 figures the comparison is more favourable still.

MARCH IMPORTS OF PETROL.

The petrol import figures for March exceed those of March last year by 169,924 gallons, but an enormous decrease of 3,000,000 gallons is registered as against the previous month's imports.

NUMBER OF GALLONS IMPORTED FOR MARCH.

1915.	1916.	1917.
18,704,459	9,076,622	9,246,546

NUMBER OF GALLONS IMPORTED.

Jan., 1917.	Feb., 1917.	Mar., 1917.
13,001,740	12,257,984	9,246,546

For comparison we quote the number of gallons imported during the first three months of this year.

A Throttle-controlled Force-feed Oil Pump.

AN AUTOMATIC LUBRICATOR CONTAINING NO BALL VALVES.

WE have on several occasions recently referred to the many advantages of the throttle-controlled mechanical pump which varies the amount of oil supplied to the engine, not only with the speed, but also with the power developed, and several pumps embodying this principle have now been placed before our readers. The present example has been invented by Mr. Arthur S. Hoad, of Portsmouth, who describes it as follows:

The double function of plunger and rotary valve is performed by the plunger, which rotates continuously and reciprocates with a stroke, the length of which can be varied from zero to a fixed maximum by varying the throttle opening. Thus, the pump delivers a supply of oil proportional to the product of engine speed and engine effort, the pump being engine driven.

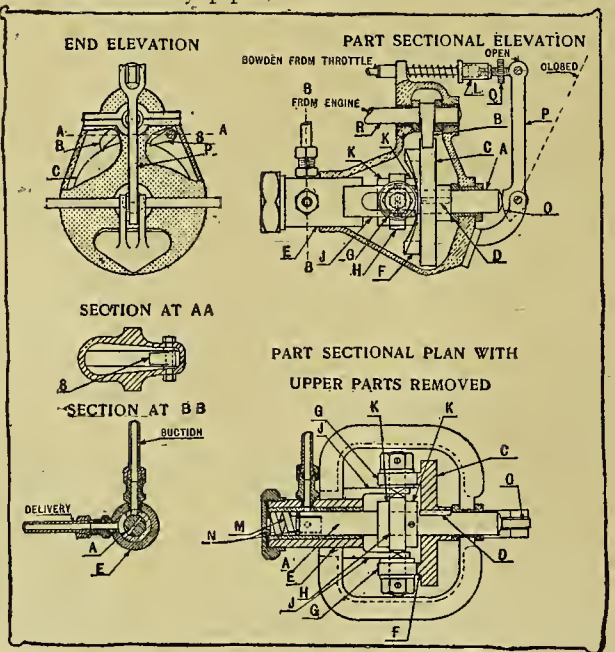
Working of the Pump.

The plunger A is revolved by means of a pawl B and ratchet wheel C, through which it can slide, being connected to C by a feather key D. The pawl B is actuated by an eccentric on the shaft R, which is coupled to the camshaft by flexible drive or other suitable means. A spring check S engages the ratchet wheel. The plunger revolves in a metal-bushed barrel E, to which are fixed the suction and delivery pipes, and as it revolves it alternately opens the suction and delivery to the pumping space. The plunger receives its reciprocatory motion from a face cam F on the side of the ratchet wheel C, working with cam rollers GG borne by a ring H, on each side of which is a projection which runs between guides JJ fixed to the barrel E. This ring H runs between two collars KK on the plunger A. The face cam F is so designed as to actuate the plunger by both rollers simultaneously, and also to give a long delivery and rapid suction. The return motion of the plunger is caused by a spring M in the pumping space, which bears on two metal washers NN which are designed to take the wear.

To provide a supply of oil proportional to the throttle opening a plate cam O on the end of the Bowden-actuated lever P prevents the plunger completing its suction stroke under the action of spring M, thus when the engine is running on half throttle the face cam and cam rollers are in contact over only one-half of the stroke. The face cam F is set so that when the pumping space is open to the delivery the plunger is forcing oil out of the pumping space and *vice versâ*.

Adjustment for Varying Temperatures

A temperature adjustment, if deemed necessary, could take the form shown in the sketch. A milled barrel L, carrying the end of the Bowden wire, can be screwed by finger and thumb along the thread cut on the piece coupling the lever P to the throttle control. A milled locking nut Q would prevent vibration from affecting the adjustment. The whole mechanism is held together by the cast aluminium casing, which is in three parts, and is so arranged to facilitate the use of split bearing brasses for both the plunger A and the shaft R. A metal cap, which can be removed for inspection and cleaning, forms the end of the pump barrel. All fastenings, etc., are omitted for sake of clearness.



Sectional plan and elevation of the throttle-controlled mechanical pump designed by Mr. A. S. Hoad.

Advantages Claimed.

The advantages claimed for this design are:

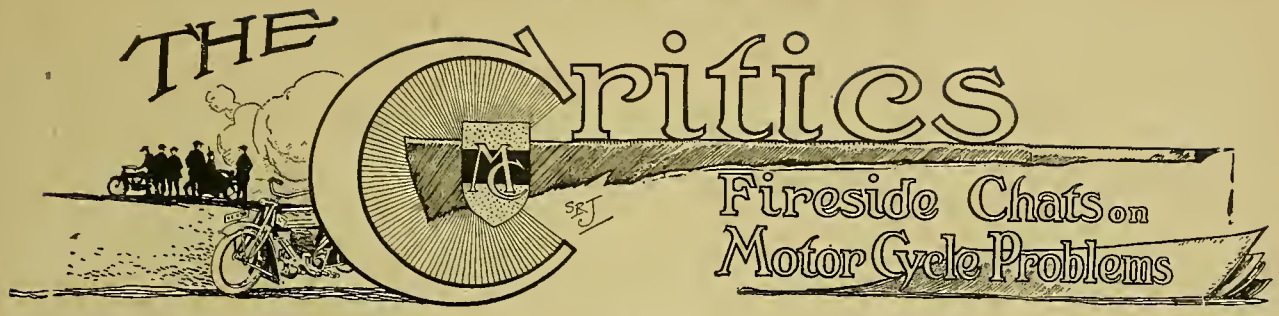
(*a*) Comparatively few working parts.

(*b*) There being an entire absence of automatic valves, the action is mechanical throughout, and this tends towards reliability.

(*c*) Since the face cam bears equally on both cam rollers, all uneven or excessive wear due to asymmetrical forces is eliminated.

(*d*) If no temperature adjustment is necessary this design is foolproof.

(*e*) No extra tension is caused in the working of the throttle control wire other than that of the necessary tensioning spring.



PLUGS.

"HOW is it," asked the Novice, "that the lives of some motor cyclists appear to consist of one perpetual string of thrilling plug troubles, while *I*—I have had nothing but gallant service from my one and only rusty old Lodge during two seasons of bad driving? I cannot understand all this criticism levelled at sparking plugs. What's the matter with a modern plug, anyway?" He turned mildly to the Journalist. "Journalists seem to experience all the fun," he explained. "Perhaps he can tell us."

But the D.R. undertook the responsibility. "You ride a low compression touring single or twin of the ordinary family type," he began. "With that class of machine a plug may last for years, but you try an oily two-stroke, or an engine which will rev., try a high compression T.T. mount, and you'll soon find out that sparking plugs are not perfect."

"It seems to me that it is entirely a matter of getting a plug to suit your individual engine," put in the Manufacturer.

Engine Designer or Plug Maker?

"Yes, if your machine is an ordinary touring mount," agreed the D.R. "Again, with a normal two-stroke, you can generally come across something after long and judicious selecting which fills the bill; but as soon as you get among engines of really high efficiency you begin to realise the imperfections of the present design of sparking plug. You search the market from beginning to end, and in the end you accept something which you know will give trouble, but which is superior to the rest."

The Journalist agreed absolutely; but the Manufacturer became restive.

"Then," said the latter, "you must blame the design of your engine, not the maker of your plug. Talking about oily engines, is there a more oily engine on earth than the Gnome? Yet the Gnome engine is so designed that the sparking plugs run absolutely dry."

"That the Gnome engine is a wet engine I agree," said the Journalist, "but it is not highly efficient nor has it a high compression. Besides, a rotary engine is quite a different matter. How are you going to arrange a motor cycle engine so that centrifugal force will keep the plug points dry?"

"There are other ways besides centrifugal force," returned the Manufacturer. "One way is to pocket the plugs, and equip the pockets all round with sufficient radiating surface to ensure a cool spot in the engine."

"That," said the D.R., "is positively piffle. You cannot pocket a plug on a two-stroke. If you do, owing to the imperfect scavenging, you will experience absolutely rotten running.

"It seems to me that the manufacturers of engines have left the manufacturers of sparking plugs behind. The ordinary sparking plug will not stand up in the latest type of engine," stated the D.R.

All were now warming up.

"Listen to this," ordered the Manufacturer. "If I, or any other manufacturer, produced an engine which cost more in plugs than in tyres we should have jolly quickly to alter our design or we should lose our market. It is up to the makers of engines to find a cool spot for the plug, and to adopt a system of lubrication which will not deter its regular working."

"Yes," said the Journalist, with his usual cynical weariness, "the maker of modern engines certainly does choose the coolest place for his plug, he puts it directly above the inlet valve, where it is subjected to the draught of every change. Let us leave out the matter of oiling-up. That does not determine entirely the efficiency of a plug."

"When a plug will not stand up in an ultra-efficient engine," said the Manufacturer, "it is a case of overheating pure and simple. Well, then, it's up to the designer of the engines to prevent overheating. Let him design a cool-running engine and he will experience no plug troubles."

The Central Electrode.

Here the D.R. thumped the table. "Listen to this," he demanded. "This is where I remove you from your pedestal! I guarantee that if you designed an engine on high speed modern lines to run as coolly as its maximum efficiency rendered possible, you would still have trouble. Why? Because the temperature at the base of the plug, and the cylinder surrounding it, does not matter a cuss! If you keep the plug base cool so much the better, because it helps to cool the central electrode, and because the cooler the insulation, the better its resisting properties—but it is the *central electrode* which causes the trouble in our modern highly efficient engines. It is the central electrode which decides the pinnacle of endurance, and which acts as a pre-igniter. The heat of the surrounding cylinder does not matter in the least, because it does not affect the temperature of the exploding gases or the temperature of the actual sparks. And mark this—I believe that if you could design a magneto so that the heat intensity of the spark did not increase with the speed, plugs would—well, they would stand up in such engines as the high efficiency flat twins better than they do."

"We are discussing plugs, not magnetos," shouted the Manufacturer with his usual tenacity. "The strength of a chain is determined by its weakest link. Now can you tell me a single instance in which plugs have stood between the otherwise justifiable winning or losing of a great record?"

"Yes," mildly interposed the Journalist; "in the world's touring car record the Talbot car people, after numerous plug failures, had to devise some special means of cooling the plugs."

"In other words," added the Manufacturer, "they had to make up what they had previously overlooked in the engine design."

"The position is this, then," said the Novice. "You (the Manufacturer) are of opinion that an engine maker should consider plugs in his design to ensure equal reliability in this quarter; and you (the D.R.) that the plug has nothing to do with the engine maker, and that it is the duty of the plug manufacturer to keep pace with engine development."

The Journalist gravely shook his head. "I agree that a manufacturer *should* choose the coolest spot in the cylinder for the plug, that he should make special provision for ensuring a cool base for the plug by the use of proper radiating fins, but there his responsibilities cease. In modern engines, you will agree, the engine designer has done all this, yet all the plugs give out before the engine. In short, the plugs are the weak link in the chain. Therefore it is up to plug makers to take a step forward and keep pace with the engine designer."

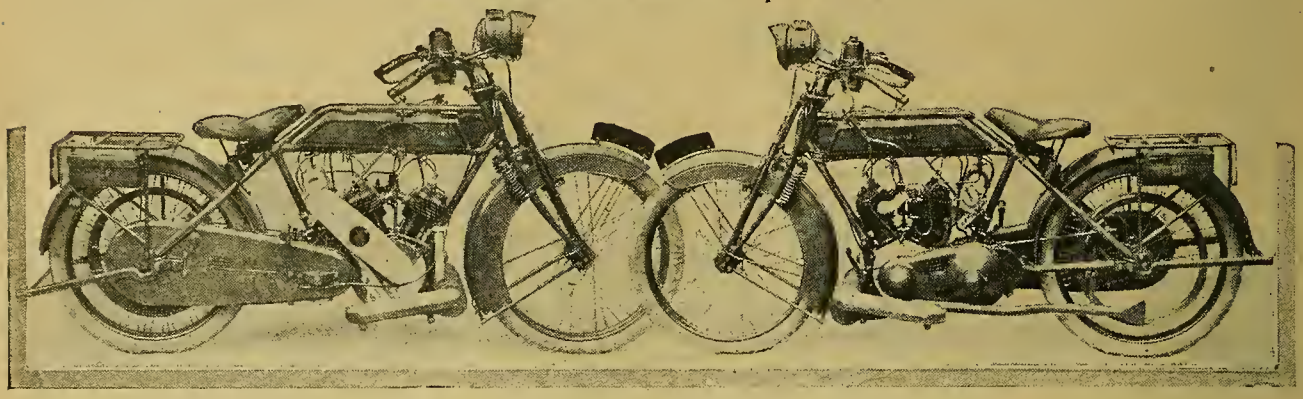
"Ye gods," cried the Manufacturer, "they have taken gigantic steps during the last few years! What about aero engines?"

"Aero engines are not usually efficient as regards horse-power per unit capacity," said the Journalist. "They are efficient as regards their weight per horse-power ratio, and, after all, there is only our British-made plug which really gives satisfaction in a high-speed aero engine—a plug designed on scientific lines, truly, though it will not stand oil. I speak of the Lodge racing plug, in the design of which some attention has been paid to the cooling of the central electrode."

The D.R. now agreed absolutely with the Journalist, but so much more was said that, this being a critical juncture, we are compelled to resort to the irritating conclusion, "Continued in our next."

SUNBEAM MILITARY MODELS.

A New 5 h.p. Twin-cylinder Mediumweight Solo Mount for the Russian Government. Amendments to the 8 h.p. Mount.



Both sides of the new 5 h.p. twin-cylinder, three-speed, chain-driven Sunbeam.

THE Sunbeam 3½ h.p. single-cylinder engine being under the cubic capacity specified by the Russian Government for solo mounts, Messrs. John Marston, Ltd., were compelled to adopt a larger engine when they obtained an order from our Ally for machines of this type. The conditions under which the machines are to be used demand engines of ample capacity, and the new Russian military model Sunbeam solo mount, which has not hitherto been brought before the notice of our readers, is equipped with a 70×85 mm. (654 c.c.) twin J.A.P. engine.

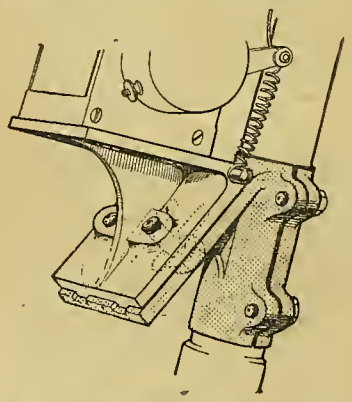
This engine is so well known that we need not occupy space by describing it, and there is no doubt that many devotees of the twin-cylinder solo mount will welcome this new arrival, hoping its addition to the Sunbeam catalogue will be a matter of permanency.

Frame Alterations and Magneto Position.

Beyond the engine there is very little difference between the 5 h.p. Sunbeam and the 1916 3½ h.p. single. We half expected to find 28in. wheels on this model, but 26in. (26 × 2½in. tyres) have been retained. The all-round ground clearance of 5in. was arrived at by slight alteration to the frame, and by raising the level of the lower cross bar very slightly space was obtained to permit the withdrawal of the cylinders. This, of course, necessitated raising the curved top tube proportionately in order to obtain the same depth of tank, but the saddle is imperceptibly higher than in the 1916 3½ h.p. single.

It will be observed from the illustration that the magneto occupies a somewhat aloof position, necessitating an abnormally long magneto driving chain. This position is demanded by the Russian specification, and we have already stated our disapproval of it. The disadvantages of the long chain drive, however, might be slightly qualified—if a disadvantage can be qualified—by the extreme simplicity and accessibility of chain adjustment obtained by the method of fixing the magneto. The castellated aluminium platform is clamped to the saddle down tube, carrying the magneto at an angle, and when the accessible holding down studs have been slackened the magneto can be slid up or down this platform, the slots remaining in register and retaining alignment during the adjustment.

The Sunbeam testers—a meeting with one or two of whom was happily reminiscent of competition days—are probably somewhat conservative in their views, and their admiration for the 3½ h.p. single does not appear to have been entirely swept away by this new model. They confess, perhaps a shade reluctantly, that it may be rather faster in the open, but as regards cool running and tenacity on hills they appear to retain fragrant memories of the single.



The magneto platform, illustrating the facility of chain adjustment by sliding the platform along its bed-plate.

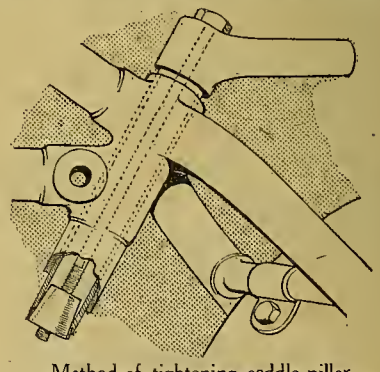
The 8 h.p. Sidecar Machine.

The chief features of the Russian military sidecar model (85½×85 mm. J.A.P.) we have already briefly described, but one or two minor alterations have since been made. Here again, however, we find that comparatively little amendment of the 1916 M.A.G. engined model was necessary. The increased ground clearance has been obtained by the use of 28in. wheels and a slight alteration of the frame, which lengthens the wheelbase from 60in. to 61½in. The saddle position is, of course, slightly higher, and the other departures from original practice approximate nearly to those already given as applying to the 5 h.p. solo mount. The magneto chain case is equally conspicuous, and one objectionable point with regard to this matter is that it renders the back cylinder exhaust valve tappet very inaccessible. This, however, is not a matter of Sunbeam design, and the old adage concerning "He who pays the piper" perhaps applies.

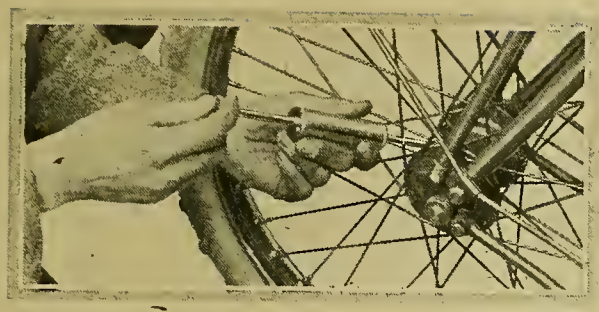
Another slight point of difference between the Russian sidecar model and the solo model is that the saddle stem of the latter is tightened in the usual way, while in the sidecar model the socket receiving the saddle stem is all in one piece, giving greater strength, the saddle being tightened by a central rod and cone inside the stem. A brazed lug affords sidecar attachment at this point.

Minor Additions and Omissions.

The carburetters on both these military models are fitted with hot air intakes, consisting of funnel shaped aluminium elbow pieces, which draw their supply from behind the front cylinder. But the mouths of these intakes do not fit closely enough to the cylinders for real efficiency, the air being but slightly warmed, for after all when a hot air intake is required



Method of tightening saddle-pillar on the 8 h.p. model. The junction lug is in one piece, giving great strength. The eyehole is for the sidecar coupling.



Forcing oil into the hub of the 8 h.p. model. Observe the feed tube, which projects through the sprocket, greatly facilitating the process.

at all it is usually required pretty badly, *i.e.*, it should be sufficient for the coldest of weather. This may particularly apply to Russian conditions, bearing in mind that the elbow can be turned aside during warm weather.

Rotherham screwdown grease cups are used on both these models, and the sidecar machine possesses one or two strongly practical features, which might, perhaps, be advantageously adapted to its younger brother. We refer particularly to the excellent front wheel mudguard and the system employed for hub lubrication, both of which points we have previously described. As regards the latter, it will be recalled that a tube extension is carried from the centre of the hub to an accessible point just outside the spokes, so that the nozzle of an oil or grease pump can be readily fitted in place and the hub filled under pressure. This way of oiling is particularly to be recommended, as the lubrication, in the act of squelching through the cones, carries out all foreign matter on the point of entry.

The Sunbeam leg shields have not been adopted by the Russian Government, though one feels that their employment would be much appreciated by the men who will have to drive the machines under Russian conditions.

Chain Transmission.

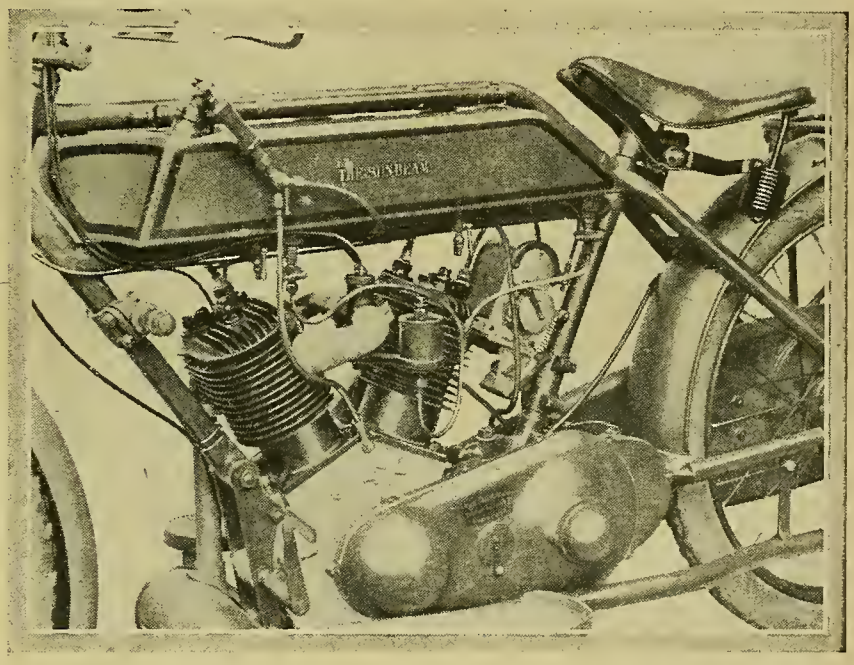
The Sunbeam system of transmission is retained throughout. The combined spring and friction shock absorber is employed on all models, and the metal-to-metal drilled plate clutch with hand control is not, needless to say, superseded.

The tanks are divided, and two leads go to the carburetter, filters being placed directly between the tank and the feed tap.

We found the Sunbeam works redundantly stocked with machines and finished parts of all kinds, one room alone containing sixty-five twin solo mounts from a batch of 100. During our visit a Russian Government inspector arrived at the works mounted on a new Russian military model all-chain Norton, and among other things we noticed that the Sunbeam works may have still further surprises after the war. On the whole our visit was replete with interest.

A BOOM IN FLAT TWINS.

AN attractive showcard has just been issued by Douglas Bros., of Bristol. It shows the famous Scottie holding in the palm of his hand the flat twin Douglas power unit, and on the slab on which he stands is the following inscription: "A monument to the leader of progression that all who would may copy." It is often overlooked that for years the Douglas motor cycle was exclusively fitted with a flat twin engine, and was the only make of motor cycle so fitted until comparatively recent times. Its predecessors were the Fée and the Fairy. Many will recall the latter, as it then appealed to them as an ingenious novelty in the way of lightweight design.



8 h.p. Sunbeam power unit, showing hot air intake and platform supporting the magneto in the position specified by the Russian Government.

Military Motor Cycling in America.

THE American motor cycle press is at the present moment calling attention to the growth of military motor cycling in the United States of America. On the occasion of the last meeting of the directors of the Motor Cycle and Allied Trades Association, which was held recently in the Times Building, New York, ordinary business was put to one side, and the members of the board devoted their entire attention to the consideration of plans for the organisation of the Motor Cycle Minute Men of America, the name chosen for the volunteer military motor cycle companies, which it is proposed to organise in all parts of the country.

Big posters have been printed in red, white, and blue, with a stirring action picture of a motor cycle despatch rider about to dash away with a message, and have been distributed in large quantities. These posters will be sent out to the newspapers by Mr. C. J. Perkins, manager of the Association previously referred to.

When sufficient signatures have been obtained for the formation of a company, active work will begin. A book of instructions, containing suggestions for organisation, and directions as to drill, signal work, etc., will be issued to members of the newly-formed company.

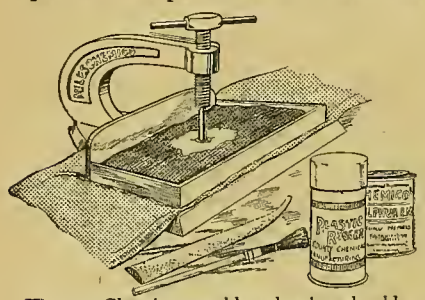
The United States Army is in agreement with the plan. It was the unanimous opinion of the directors of the Motor Cycle and Allied Trades Association that it was the imperative duty of everybody connected with the motor cycle industry in the United States to offer every possible assistance to the Government, and the very fact that the motor cycle had become indispensable to the efficiency of the modern army is all the more reason for a prompt and patriotic response to the call. It appears that military motor cycling is being taken up very seriously over the water, and doubtless many lessons will be learnt from the work of the brave British despatch riders, who have by their devotion to duty and by their good work set up a splendid standard for our new Allies to follow.

A NEW PORTABLE VULCANISER.

A Trial of the Miles Chemico Vulcanising Outfit.

THE County Chemical Co., Ltd., Bradford Street, Birmingham, fills a long-standing need with a set of materials for effectively and permanently repairing punctures or bursts. It consists of a small metal clamp, a copper tray, tins of the necessary plastic rubber and sulphur emulsion, a rasp, a brush, and the firing medium. This is in the form of cakes of a secret composition, which burns somewhat after the manner of the old-fashioned fusee, and gives off considerable heat.

The *modus operandi* is to clean up the break in the tube by means of the rasp, apply two coats of sulphur emulsion and a patch of the plastic rubber, insert the



The new Chemico portable vulcaniser should make a special appeal to sidecarists.

tube in the clamp with the copper tray containing a fuse on the *top* of the repair, and screw down with a reasonable pressure. It should be noted that the repair is to be placed upwards and not face down, as is the usual way. It is advisable to protect the tube on both sides with a slip of thin paper. The fuse is then ignited in the centre, the red portion flares up for a few seconds, and the remainder goes off with a fizzling splutter and a certain amount of smoke, leaving a red-hot cake of ash, which holds its heat for a long time. It was too hot to touch more than twenty minutes afterwards. About ten minutes is sufficient for an ordinary repair. Our experimental repairs have been quite successful; their lasting qualities we have not, of course, had time to prove. We found that there is no need to put much pressure on the repair, and that protection by paper or French chalk between the underside of the tube and the clamp is advisable. The firing operations should not be conducted in the drawing room. Although there is no danger whatever, it is preferable, for reasons of domestic peace, to do the repairs out of doors or in the garage. The whole outfit, priced at £1 1s., which includes six fuses, is very compact, and can be carried with the other tool kit. Extra fuses cost only a few pence, and the average cost of a repair is about 7d. The makers are to be congratulated on producing a very handy and serviceable vulcaniser, which will appeal especially to sidecar owners. Although the need for roadside repairs is now exceptional, it renders a permanently vulcanised repair by the roadside a reality.

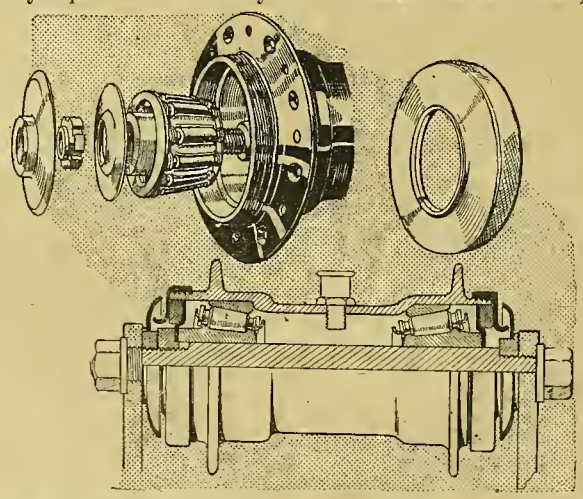
HUB DESIGN.

A Dirt-excluding Adjustable Roller Bearing.

A GREAT amount of attention is being given at the present time to the hubs of motor cycles, and we have recently illustrated several ball bearing front hubs, which have been designed with the object of excluding the mud and water thrown up by the wheel. On this occasion we illustrate the Timken roller bearing, which has been used with great success by the James Cycle Co., Ltd., for several years, notably in the last Tourist Trophy Race. The Timken is an adjustable roller bearing, but it seldom, or never, requires adjustment. As the rollers are taper in shape, the internal part of the bearing is very easily removed and replaced; the rollers being in a cage do not fall away from the internal race. These bearings are expensive to buy, but they should wear almost indefinitely.

The question of roller bearings for motor cycle wheels is of more than usual interest at the present time, owing to difficulties in the supply of ball bearings, and we are of opinion that they might be widely adopted with advantage to all concerned. It is, however, of the greatest importance to exclude all grit, and we would suggest that the hub under review would be vastly improved by the adoption of wider forks and the addition of distance pieces between the fork ends and the hub, for this would give the mud, which runs down the forks, a far better chance of dropping off before reaching the bearing.

The Timken bearing, owing to its ability to withstand side thrusts, is specially suitable for motor cycles to which sidecars are attached, for the best aligned sidecar causes a considerable amount of drag, which is very apparent in the case of heavy and luxurious outfits.

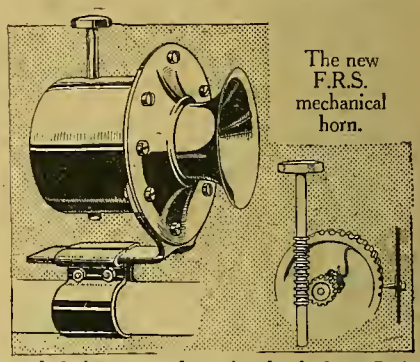


The Timken adjustable roller bearing used on James motor cycles.

NEW PRODUCTIONS BY F.R.S.

A New Mechanical Horn and Handle-bar Switch.

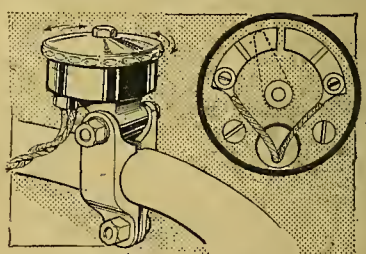
MESSRS. F.R.S., the well-known makers of lamps (electric and otherwise), of Pershore Street, Birmingham, have added a mechanical horn to their list. It is somewhat similar in appearance to others, but has certain points of novelty. The plunger is a circular rod instead of a square bar, the necessary



The new F.R.S. mechanical horn.

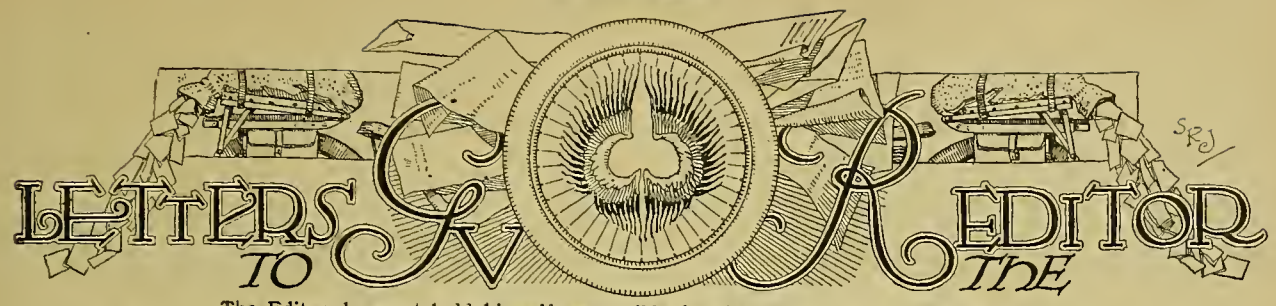
teeth being turned up in the lathe. It is claimed that, as this is free to revolve, it equalises wear, and consequently prevents the rattle which some horns develop after a short time. There is a simple "free-wheel" action between the driving cog and the spur wheel which engages the pointer on the diaphragm, so that the note continues after the plunger is fully down, according to the force applied. The whole mechanism is held in a frame, which can be moved very easily. We have had no opportunity of testing the horn, but we understand that it gives a gentle yet far-reaching note, the result of much careful experiment. It is made with alternative clips for motor cycle and for car use, and is marketed at 17s. 6d.

Another novelty is a handle-bar switch, useful for many purposes—electric lighting, cut-out, etc. It consists of a small circular box casting with plated cover,



A neat handle-bar lighting switch.

which can be moved a quarter of a turn either way of a central point at which contact is made. It is a simple rubbing contact between an insulated brass spring under the cover and two brass segments and terminals insulated from the box. It is designed to fit in any position on the handle-bar or frame tubing.



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

MISFIRING.

Sir,—I have noticed from time to time that several of your readers have been troubled by misfiring in the front cylinder of their Douglases. I had the same trouble for some time till I saw that the front plug was sparking against the mudshield, thus preventing the current from reaching its proper destination. FETTPEN.

Edinburgh.

MOTOR CYCLES FOR DESPATCH RIDERS.

Sir,—I note in your issue of April 19th an excellent letter from Cpl. Gordon C. Reid, Fermoy, Cork, and as a D.R., riding under the same conditions, I heartily endorse his statements. The 2¾ h.p. Douglas, which proved a splendid all-round machine on the roads of Scotland and England, has failed to stand up to the work on the rough Irish roads. Numerous cases of broken frames and fork springs have occurred in the D.R. section of the Signal Company at present doing service in Ireland, and it may safely be assumed that any D.R. running a 2¾ h.p. Douglas in this country would welcome with great pleasure the issue of more powerful machines. One troublesome feature of the Douglas is the exposed chain, which, owing to the grit and mud collected on it, soon shows signs of extreme wear, with consequent breakages *en route*, and the usual messy roadside repair. My own choice of a machine, suitable for D.R. work, would be a good British-made 4 h.p. single, with countershaft gears, chain-cum-belt drive, handle-bar-controlled clutch, semi-T.T. bars, footrests, and, for preference, gear changing by pedal.

JAMES W. TAYLOR (Cpl. R.E.).

A VARIETY OF CONDITIONS FOR DESPATCH RIDERS.

Sir,—On reading the correspondence in the *The Motor Cycle* referring to the road conditions out here for D.R.'s and the depth of pot-holes in particular, may I ask what your correspondents' crank cases are made of and what happens to them (their crank cases) when their front wheels drop into pot-holes 18in. deep, and whether pot-holes of this depth are the exception or the rule? I have found they are inclined to be the former, including the roads on the Somme, and also after the long frost at the beginning of this year. And if anyone thinks that pot-holes, because they are only about five or six inches deep, are easy or pleasant to ride over, or belittle the difficulties of D.R.'s to people at home as regards road conditions out here, let him try riding over a dozen or so holes, about 5in. deep and a yard apart, and see if he doesn't imagine he is riding over holes twice as bad as they really are.

Certainly lorries do make ruts 16in. or 18in. deep, but as they generally seem to run in the same direction of the road, the low gear and careful use of the clutch may generally be relied upon to "pull one through."

In the last twenty-seven months out here I have only been through one piece of water which covered the magneto on my 4 h.p. Triumph. I did not "rush it," and it speaks well for the large pulley on the countershaft gear that the belt did not show the slightest tendency to slip, though the base of the cylinder was under water for fully ten yards. The magneto is an M.L. Usual disclaimer.

In conclusion, I might mention that I am not a D.R., and most certainly don't think that the D.R.'s have a "cushy" job. P.T.L. (A.S.C., M.T.).

B.E.F., France.

A LUDICROUS DERANGEMENT.

Sir,—Referring to "Ixion's" comment in your issue of April 19th, I have had an experience very similar to that of the B.S.A. rider. My machine was a 1914 4 h.p. T.T. Triumph, single-geared, and this machine always went better uphill than on the level. The only cause I could find for this unusual behaviour was a loss of compression owing to a very liberal drilling of the piston walls. Often when starting you could push the machine along over compression, and the charge appeared to pass by the piston and find its way through the crank case release in the crankshaft. As I did not keep this machine for long I had not time to try a new piston or even new rings. I may say the engine always had plenty of power, but ran very much better when pulling hard. CYRIL J. TURNER.

PETROL ALLOTMENTS.

Sir,—I notice in your leader on petrol allotments a statement to the effect that licences for petrol or petrol substitute, except for "business and public duties," have been stopped. This is not correct, as licences are still being issued for pleasure purposes to a good many.

A friend of mine only a few days ago, whilst we were talking upon the subject, produced a new licence granted to him for sixty gallons (ten gallons a month). He uses his car solely for pleasure purposes, and did not ask the Petrol Control Committee to renew his licence; they simply sent him a form asking him to renew it, which naturally he did. He also knew and mentioned the names of several who have obtained new licences for similar quantities of petrol, all for private purposes.

I have applied to the Petrol Control Committee asking them to grant me a new licence for ten gallons (two gallons per month) to enable me to visit my son, a youth of eighteen, in camp. This has been refused, but since I came in possession of the above information I have written again to the Chairman stating the facts of the case, to which at present no reply has been received.

B. H. W. CLARIDGE.

FRAME DESIGN.

Sir,—I have read with much interest the article on frame design (April 26th, page 370), and am inclined to agree that many frames might be improved.

I have often wondered whether the persons responsible for the shape of some frames think what functions a frame has to fulfil when it is on the road. Judging from resultant designs there must be a diversity of opinion on the subject.

For instance, how can a curved diagonal (front down) tube correctly fulfil the function of partially pushing the front wheel along and at the same time carry about half the weight of the engine and also withstand its power impulses, etc., without a certain amount of give?

I should very much like to know exactly how the power transmitted to the back wheel is utilised to push the front wheel along, *i.e.*, what tubes take the thrust or how is the thrust distributed.

Again, I cannot see the necessity for the very short steering columns some makers fit. If it be to retain a horizontal top tube, the sooner that fetish is abolished the better. The bend under the saddle was evolved in the first place, I believe, to give a lower saddle position without unduly sacrificing petrol space.

I should very much like you, Mr. Editor, to give the frame theorists space for a time in which to air their views.

Monmouth. C.A.F.

LARGE FLAT TWIN ENGINES.

Sir,—After reading your description of the latest A.B.C. engine and its capabilities, I should imagine the critics of the large flat twin will feel somewhat crestfallen. To the engineer there is no doubt of the superiority of the flat twin over the V twin, and persons who say it cannot be successful in the larger sizes have nothing whatever on which to base or prove their statements.

The 10 h.p. A.B.C. engine appears to be almost the last word in engine construction, and happy are the men under Mr. Bradshaw who will be able to study its development. The only point one dares to question is the employment of ball and roller bearings in such a large engine. Ball bearings are ideal for steady loads, but where they are subject to pounding action I should imagine they would not give such good service as the plain bearing. However, they have every chance to make good in the A.B.C., as they are correctly housed, which is more than can be said of the ball bearings in many other motor cycle engines.

Bournemouth. ENGINEER.

AN ECONOMICAL TWO-STROKE.

Sir,—I was very pleased to read the letters of your correspondents "Chinook" and "Capt. R.A.M.C." under the above heading in your interesting journal. Two-strokes are not only economical with petrol, but with tyres and one's strength when handling.

Personally, I do not think the two-stroke has yet received the approval and commendation its merits deserve, simply because it has been tested and tried by the greatly experienced motor cyclists. For instance, how can one expect a *fin de siècle* rider like our friend "Ixion" to appreciate the simplicity of the Levis, although lately even he seems to be realising its possibilities?

Let me say I do not think for a moment that the two-stroke will knock the four-stroke out. The one is a hack and the other a big horse. I became a Levis rider more from compulsion than choice, because, having to look after a motor cycle depot through the absence of a near relative doing his "bit" in France, I found it advisable to obtain some practical experience and knowledge of the things I was selling.

In my eyes the beauty of the single speed two-stroke is its simplicity. It is almost as easily managed as a pedal cycle, and if its merits were sufficiently boomed I think there is a great future for it. Especially does it fill the wants of those who, like myself, having passed their first youth, wish to go further afield than they care to do on a self-propelled cycle. It is a splendid introduction to the joys of motor cycling, because it requires little or no mechanical skill or knowledge. 26in. wheels may be an improvement if they do not increase the saddle height. If so, it would be a disadvantage to short men, because it would interfere with easy paddling off and the sense of security felt of being near to Mother Earth that 24in. wheels give. G. WILLIAMS.

NOT TOO OLD AT ——

Sir,—When your correspondent, "W.S.T.," writing from Reading, remarks upon seeing two grey-haired old men riding Douglas motors, I have no doubt he is referring to my brother and myself, for each of us rides a Douglas. I am 68, and my brother is between 70 and 80 years old, and we reside within a few miles of Reading.

It was not in any way remarkable that we should take to motor cycling. We have ridden cycles since the year 1863, some years before the bicycle was invented. Our first mount was a wooden four-wheel velocipede, made by a local carpenter. Since then we have been through all the stages of evolution of cycles, from the first bicycle, with cast iron frame, and wheels made from iron gas piping, and the saddle a piece of shaped sheet iron, without any covering whatever.

The improvements in bicycle construction just kept pace with our advancing years, and when the bicycle reached its present finality, and our strength and energy were just on the wane, and when we no longer possessed sufficient power to propel ourselves as of yore, the motor bicycle came along, and, supplying this want, enabled us to enjoy a new lease of cycling life, for which we are truly grateful to the mechanical world.

I took to motor cycling in 1902, but it was not until 1912, when I had a Douglas, that I could induce my brother to get across one, not even on the stand. He was quite cross with me when I told him at what pace I could travel, and hoped I should soon have to pay the penalty of breaking the law, by being caught in a police trap. However, I did at last get him to try the Douglas on low gear, and he liked it, and would have one if the makers would turn out one guaranteed not to exceed 12 m.p.h. Eventually, this objection he waived, and he purchased a Douglas. On the first run he was too nervous to start it himself, so I pushed him off on low gear. After four miles he stopped, and I asked him to try the high gear, but he objected, saying the low gear was quite fast enough for him, in fact too fast. However, I persuaded him and pushed him off on high gear, but by the time I got back to my machine and mounted he was out of sight, and though I travelled along as fast as I dared, it was not until Blackwater that I caught him up, just as he was rushing up the rise to Hartford Bridge Flats, and along the three miles of which he went at 40 m.p.h. When he stopped I asked him if he knew what pace he had been going at, his only reply was: "Ha, a nice piece of straight road, wasn't it?" This was the first ride of a man who wanted a machine not capable of going over 12 m.p.h.

"W.S.T." adds: "Albeit taking all corners very carefully." I wish it were so, I cannot get him to. Last year, while travelling along a country road which crosses a semi-main road, he dashed along as usual, and at the crossing ran into a motor car travelling 30 m.p.h. His front wheel struck the hinder part of the car, the car went on, the bicycle rebounded and, as he forgot to shut off the engine, went forward again, but was instantly brought up by the buckled wheel; my brother came off unhurt and unscratched. The gentleman with the car kindly drove him and the bicycle home, and wanted to pay damages, but to this, of course, my brother would not consent, as it was entirely his own fault.

I quite understand and forgive "W.S.T." designating us as "two grey-haired old men," for eighteen years ago, while we and two friends of our own age were cycling down the long hill leading into Midhurst, some vulgar boys, utterly devoid of the reverence due to age, shouted out: "Here comes four more—and all old 'uns."

EDWIN BUTLER.

AIR V. WATER-COOLING.

Sir,—With regard to Mr. Hitchcock's reply of the 19th April:

(1.) The copper washer at the joint of the cylinder head cannot by itself distribute the heat evenly throughout the cylinder, although in actual practice the head may remain sufficiently cool. The fact that the Blackburne is fitted with this type of cylinder head does not prove that the joint can be maintained gas tight when the head has been removed several times, nor is this feature exclusive to the Blackburne. Mr. Hitchcock should remember that detachable heads are not employed solely to enable lazy amateurs to overcome half their decarbonising troubles, but to allow the manufacturer to machine the inside of the cylinder.

(2.) Casting fins on the water jacket should assist in the cooling, but does Mr. Hitchcock mind giving more details, and if possible a sketch, of the type of radiator that he proposes to use?

(3.) Up to the present petrol has been obtainable throughout the country in the usual two-gallon tins.

(4.) The torque of a single is not good enough for sidecar work because the power impulses are separated by too great an interval, considering the added weight and drag.

(5.) The outside flywheel would be welcome rather to keep the engine turning over evenly than to facilitate the starting.

(6.) As regards multi-cylinders not being exhilarating to drive, we want the response of the machine in point of speed, to the movement of the throttle lever, and do not require the intermediate reverberations which the single-cylinder usually gives; a six-cylinder motor cycle would not have *too* even a torque.

(7.) Mr. Hitchcock should consult some authority on the subject of galvanising causing brittleness, as the shocks sustained by the frame and forks of a motor cycle cannot be compared with telephone wires, which are merely suspended from point to point.

(8.) The flat twin 6 h.p. Humber is cumbersome as a solo mount, where water cooling is unnecessary. Moreover, the machine is built as a sidecar machine especially.

Ulverston. W.F.C.

THE ENGINE AS A BRAKE.

Sir,—I note with interest Mr. Howard's letter on the above subject. But my experience has been this: On steep hills engage the low gear and open the compression tap. The engine then acts as a wonderfully powerful and smooth brake. Should it be too powerful, it is only necessary to open the exhaust valve the smallest fraction of an inch; this will ease matters. My opinion of using the engine like Mr. Howard has been is this: On the inlet stroke air is drawn into the cylinder, compressed, and on the firing stroke expands, following up the piston, thus acting like a spring, alternately receiving and giving out power. Personally, I have obtained greater braking effect by lifting the exhaust valve than from the compression. I am sure if Mr. Howard tries my dodge he will be surprised.

I.O.W. MECHANIST.

PARAFFIN RESTRICTIONS.

Sir,—In common with others, I have been interested in ascertaining what restrictions could be enforced on the supply of paraffin primarily intended for domestic illumination, but which could be easily transferred to a motor cycle tank.

During an Easter run into North Wales, after weary months of "munitioneering," I discovered, in some of the country districts, the local inhabitants are seldom allowed their usual quantity of paraffin, and in many cases their demands are reduced to one-half. All requirements by new customers are immediately refused. My host at the schoolhouse strongly resented being compelled to adopt candles as a "substitute" to eke out the modest paraffin supply. Will it end in domestic paraffin cards controlled by the Petrol Committee? Heaven forbid.

F. E. SCHOFIELD.

BRITISH MAGNETOS.

Sir,—I should be glad if you would find space for a small paragraph in your valuable journal, calling attention to the kind and prompt attention with which I was recently treated by the M.L. Magneto Co., of Coventry.

The facts are these. I was having a short tour in the Eastern Counties, and just before going into Hunstanton I had magneto trouble, which could not effectively be remedied at any of the garages I called at; so on the Wednesday I wired to the M.L. Co., explaining my difficulty, and pointing out to them that I must be back at business on the Monday, as I am on munition work, and I was pleasantly surprised to receive another magneto by the first post the following morning, which I consider very good treatment indeed, and, of course, I was enabled to get back to business all right. Usual disclaimer.

W. JACKSON.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—The fact that the accommodation of the eye is the same ("infinity") for all distances above fifty-five yards renders the statements of "C.Q.M.S." and Mr. Lacey in your issue of April 19th somewhat contradictory. The former states that in military work (which concerns distances greater than fifty-five yards) one-eyed men judge distances accurately, and the latter explains this by a theory which is applicable only to very short distances, such as one to five yards, and is absolutely inapplicable to distances greater than fifty-five yards.

If "C.Q.M.S." is correct the whole theory of binocular vision which has been held by physiologists the world over for many years will have to be scrapped. I hope he will forgive me when I say that I suspect that he is not an accurate observer, and that I am inclined to put his statements in the same category as those of the motorists who got phenomenal increases in mileage and power by adding naphthalene to their petrol—increases which theory showed to be impossible, and which have been proved to be impossible by tests at Faraday House.

A moment's consideration will show that Mr. Lacey's method is not practicable on the road, where the observer, and often the objects observed, are all moving, and where the estimation of several distances must be made instantaneously. Suppose, for example, that the observer wishes to pass a car and that another car is approaching. One eye, operating by foeussing each car in turn, would be quite inadequate to judge whether it would be possible to pass the first car, even supposing that both cars were less than fifty-five yards distant at the time. The reason is that by the time the distance of the second car had been judged the other distances would have altered so much that a comparison would be impossible. The only safe judgment under such circumstances is that afforded by two eyes, which give every separate instant a stereoscopic view covering all the objects and their changing relative distances.

A. L. GRAY.

SIZE OF MAGNETO.

Sir,—The connecting rod of my Premier broke in August, 1914, and as I could not wait for replacement I invested in a Sun single speed, the only one to be had in the district new at the time. After four months' use I was troubled with the ignition and overhauled the contact breaker, so that I obtained two more months' use. It finally refused to go, and the magneto was blamed. I overhauled the engine twice with no better result, and did my work on the car. I then replaced the magneto with the one from the Premier, and the engine fired in two yards. What a revelation! No four-stroking, I can crawl, grease has no terrors, climbing is vastly improved, and the little Sun-Villiers has become a different machine, even when the first magneto was in order. I can turn at right angles into a sharp rise with retarded spark, and mount as if on a second gear. Builders should try the larger magneto, and the market for two-strokes will be greatly increased.

Aberchirder, Banff. M.B.

TWO-STROKE V. FOUR-STROKE.

Sir,—I am pleased to see some of your readers have taken up this question. I should like to add a few more words in praise of the baby four-stroke.

Another reader has found the speed of the 2½ h.p. J.A.P. greater than that of the two-stroke of the same c.c. I think many more riders would find this out if they kept their engines in better tune, especially as regards the clearance between the valve stem and the tappet, which tends to make a rattle. I met a rider of a baby four-stroke who complained of the rattle his engine made. I noticed he had about an eighth of an inch clearance between his valve stem and tappets. I could not persuade him to adjust them, so he went his way wishing he had purchased a two-stroke.

This is where the two-stroke rider thinks he scores with practically nothing to adjust and no clatter of tappets, but any noise that might occur cannot be heard for the hum of the exhaust, and he does not discover it till something serious happens. Again, he has to decarbonise about every 600 or 800 miles to keep his engine in good tune, while the four-stroke rider can do about 2,000 miles before he need think of decarbonising. I might add that I give my engine half a pumpful of oil every three or four miles, which I think it needs, for it never runs below 25 m.p.h. unless delayed by traffic.

I think "A.R.T." is quite wrong when he says the lightweight two-stroke will beat the lightweight four-stroke. He speaks of the Radco making a journey from London to Leeds with an average of 21 m.p.h., and for several miles touched 40 m.p.h This he might have done, but he has to stop on the 40 m.p.h. limit, while the four-stroke will do another 10 m.p.h., and it is that other 10 m.p.h. that is required to make a better average.

As regards hill-climbing, I admit the four-stroke requires a lower gear ratio to keep up with the two-stroke on a stiff hill, but on a hill like Cheddar Gorge, which, I believe, has an average gradient of 1 in 11, the four-stroke would make by far the faster ascent, while it undoubtedly proves its superiority in speed on the level.

I think for this reason the youth of to-day will pick the baby four-stroke for its speed, "for youth is wild," and is fascinated by speed, while the rider of more advanced years would choose the baby two-stroke for its simplicity and easy starting.

Now what has the two-stroke rider got to say as regards speed?

FOUR-STROKE.

Ilford.

SUMMARY OF CORRESPONDENCE.

CLUTCH CONTROL.—New Imperial Cycles, Ltd., replying to "Æsculapius" (Sheffield), inform us that they fitted a handle-bar-controlled clutch to their tourist model three years ago, and have also embodied a hand clutch in their heavyweight sidecar model.

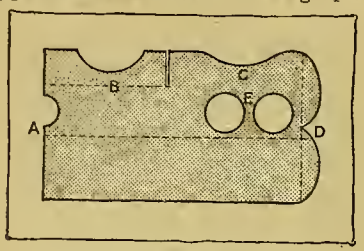
IDEAS: Useful and Ingenious.

Readers of "The Motor Cycle" are invited to contribute to this page any ideas successfully adapted to their motor cycles. Rough sketches will suffice.

AN EFFICIENT VAPORISER

AS a result of reading various ideas which have appeared in *The Motor Cycle*, I made a device, which has turned out very succesfully. The machine is a 1916 2¾ h.p. Calthorpe-Jap, Amac, with induction pipe about 5½in. long. So, having made a paper pattern, I obtained a sheet of 18 gauge copper about 14in. × 8in., and cut as shown in the sketch.

The holes at E are for valve caps, copper asbestos washers being placed



Pattern of the vaporiser described. This is cut in 18 gauge copper.

above and below the plate. The curve at C is to avoid the compression tap, and B shows where a portion is bent down over the magneto drive cover. A is fitted to the cylindrical part of the carburetter which contains the throttle slide.

The dotted line shows where the plate was bent at right angles, and at B in a natural curve around the induction pipe, whilst the front edges were curved outwards to catch the draught.

A small petrol tank, complete with tap, tube, and union, was purchased for 6s. 6d. and secured by a home-made clip to the down tube just below the main tank, crosswise. As the tap was fitted in the centre I had to unsolder this and insert it at the end, also patch the previous hole. The nut carrying the jet was removed and drilled. Into this a short bit of tube was fixed leading from the small tank.

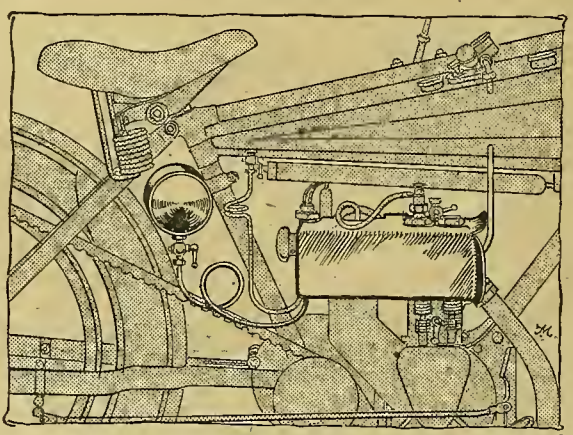
For starting purposes this gives petrol direct to the jet. After running fifty yards on low gear the main fuel tap is opened and the petrol closed without stopping the machine.

The float chamber and body of the carburetter, also the joint around the plate and air intake, were well wrapped with ¼in. asbestos rope. After a two-mile run the float chamber is 100° F., the carburetter mixing chamber 150°, and the induction pipe about 200°. Under these conditions there is nothing to gain by fitting an exhaust warming system.

Anyone conversant with the shape of an Amac will see that all the air is supplied hot from the engine by the same shield that radiates away the heat from the valve caps. The float chamber obtains its heat by conduction from the gas chamber.

The fuel is one-third paraffin and two-thirds substitute, and burns without any trace of smoke or plug trouble.

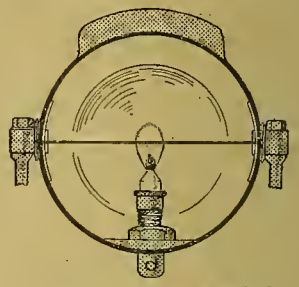
I should also mention a cork is used as a stopper for the small tank, and easing this and then pressing down floods the jet and float chamber and ensures a good start. I believe I could run on neat paraffin, but it smells and is greasy about the machine and person.—H. WALKER, Alexandria, N.B.



The heavy fuel device as fitted to a 2¾ h.p. Calthorpe-Jap.

TO KEEP TAIL LAMP ALIGHT.

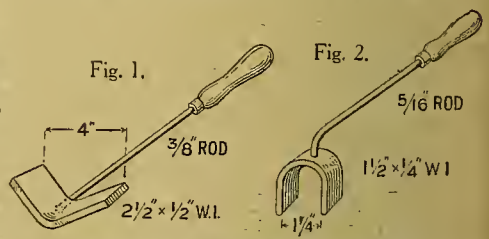
A PIECE of piano wire or any wire placed over the burner of an acetylene lamp in such a place that it becomes incandescent will save much annoyance by re-igniting the gas when the flame is jolted or blown out. The wire should be taut, if possible, as this keeps it in position over the burner. It is not practicable to lay down the exact distance from wire to burner or say whether the wire should be at right angles or parallel to the flame, as so much depends on the type and size of burner and exact kind of wire used. As a general rule thin piano wire placed one-third of an inch above a tail lamp burner and at right angles to it is satisfactory. This device is not absolutely infallible, but its usefulness is undoubted. —B. ENGLAND, B.E.F.



A piece of wire stretched across the acetylene flame will, it is claimed, re-light the gas if accidentally extinguished.

STARTING COLD AND GUMMED ENGINES.

FIG. 1 represents a contrivance which is useful when starting up an engine that has become stiff in consequence of congealed oil. After heating the tool to black heat in the fire it is placed under the crank chamber. This causes a sufficient thinning of the oil inside



Simple contrivances for effecting easy starting.

to enable one to free the engine with ease. Fig. 2 is a similar device to fit on the inlet pipe. It may be heated by pouring about half a thimbleful of petrol on the horseshoe part, then setting light to it. This will give sufficient heat to the metal to enable it to warm the induction pipe when placed thereon, and in consequence give a more inflammable mixture.—H. V. BOOTH, Manchester.

CARBON PENCILS.

IF the carbon pencil of a magneto requires renewal and no spares are at hand it is not difficult to improvise a perfectly satisfactory substitute from the carbon pencil of an old flash lamp battery. First the hard surface must be filed off, and then the pencil can be reduced in size, and finished by being held in a hand drill (if no lathe be available) and revolved against a file or emery paper.—SALTER'S GARAGE, Sunninghill.

THROUGH ZULULAND and NATAL

Across the Veldt with a 3½ HP. Rover & Sidecar.

OUR tour commenced on September 26th, 1916, and the plan was to travel from Durban up the north coast road through Verulam, Stanger, Ginginhlovu, then west to Eshowe (the capital of Zululand), Melmoth, and across country to Dundee, thence south through Ladysmith, Colenso, Mooiriver, Howick, Pietermaritzburg, and back to Durban, a round journey of approximately 600 miles. At 1.30 we started away with a grand wind at our backs. Passing over the Umgeni River, we continued our way for miles between vast fields of yellow-ripe sugar cane which stretched on either side of us for great distances. Occasionally we passed a sugar mill, and got all the benefit of the very disagreeable smell which always emanates from these places. There were several long hills, but the machine hummed up very sweetly as if anxious to get along.

Watersplashes and Tobacco.

In the afternoon we passed through the pretty little town of Verulam, which stands on the banks of the Umhloti. When we reached the south bank four Indian youths proffered their services with great gusto, and we handed the outfit over to their tender mercies whilst we crossed the river by a small plank bridge.

A bridge across the Tugela River. Notice the unusual construction.

Verulam's staple industry is tobacco growing and cigar making.

Indians live here in thousands, and they are very interesting and obliging. The lazy pleasure-loving native is entirely in the background, and, in fact, is employed by the Indians to do the more menial and unskilled labour. The Natal tobacco industry is rapidly going ahead, and from personal knowledge I know the Natal product to equal and even excel some of the imported high-grade cigars.

Between Verulam and Stanger we had to pass through two more rivers, the first crossing being very difficult, as there was no one to advise or assist us. The river was fairly deep, so we effected a very laborious crossing over numerous large boulders. The liberal "ground clearance" of the Rover proved valuable here, and nothing was broken. Now we sped on to the Umhlali River, a crossing which some had prophesied would "beat" us because of its depth and great width. As we neared it about a dozen native youths ran after us and screamed their ability to push us through. This crossing is almost 100 yards wide, and we remained on our seats while four of five youths safely propelled us through.

Entering Zululand.

Soon we commenced to traverse Zululand, and the introduction was a bad one. The road was awful, consisting of short, sharp, steep hills, which tried the hill-climbing and cooling qualities of the engine, but it never "jibbed."

It was a lovely spin downhill to the station of Inyoni, where we had arranged to meet an old friend who was to drive us out to his home high up in the hills nine or ten miles off the main road. We romped down into the hot, feverish valley in which Inyoni lies, and reached the meeting place at four minutes past eleven o'clock, having travelled ninety miles from Durban. Then we drove up the mountain track in his two-horse American spider, and had an exciting trip. It was interesting to observe the dipping tank in which hundreds of cattle be-

Indian youths who helped in the crossing of the Umhloti River, evidently lined up in anticipation of backsheesh.

Through Zululand.—

longing to the natives were at that moment being dipped to prevent the East coast fever from attacking them. One night only was spent there; next morning we drove down to Inyoni again and restarted our travels.

Heat, Fever, and Reptiles.

At twelve o'clock Ginginhlovu was reached, and we called on another old friend there. Looking from the verandah of his house there is nothing to be seen but miles and miles of sugar cane. Snakes and crocodiles abound in these parts. Close to this spot there is a stream in which a crocodile has its lair, but it was not to be seen when we passed the spot.

After travelling along a level stretch for a mile or two, there commenced a long descent into the valley of the Umhlatuzi River. This valley is very hot and very "feverish," and we had been advised to get through it before the mid-day heat. It is what is called "thorn country," and about the weirdest, loneliest, hottest, and most dismal patch of country I had ever seen. There was a dead calm and hardly a sign of life; we were right in the wilds. Sand was very troublesome, but by keeping up the "revs." and occasionally jumping up and down in the saddle of the Rover we just ripped through it all.

One Wednesday we left Colenso, and passed Naval Hill, where during the Boer War were placed naval guns which shelled the Boer positions, and where that awful armoured train disaster took place. Then on we went through Frere and Ennersdale down to Estcourt, which was reached at 3 p.m.

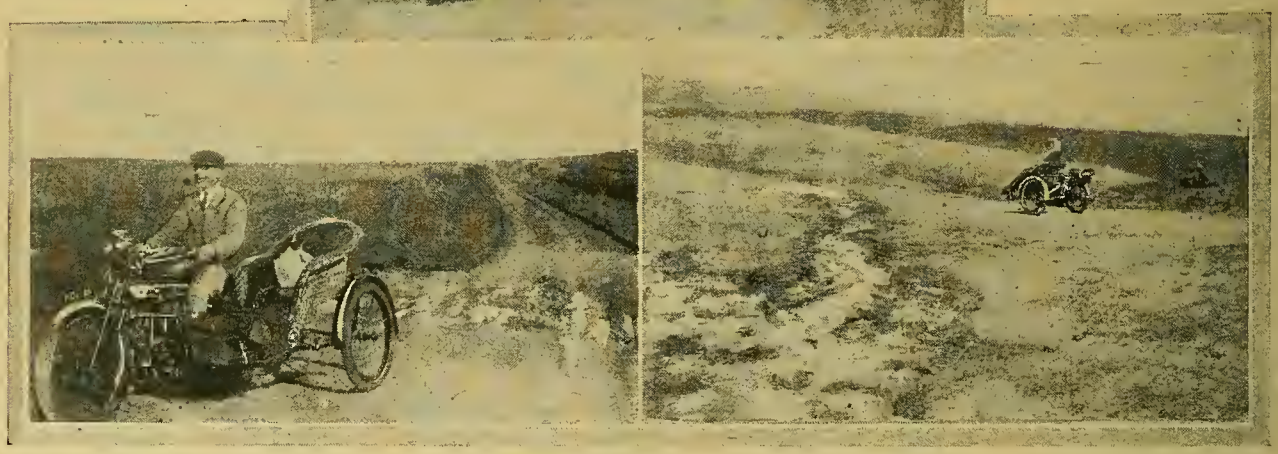
We now came to an excellent road, being the main Durban-Johannesburg road, and our faces were set towards home.

Our next place of interest was Howick Falls, which have a sheer drop of 365 feet, and are said to be the third highest unbroken falls in the world. We had a short trip through the surrounding district and were charmed with the beautiful country we saw. When about ten miles out of Maritzburg one of the connections between the motor cycle and sidecar broke, and things looked very serious indeed. We did the best we could and drove very slowly into Maritzburg like a damaged ship.

Next morning we left Maritzburg for Durban, and had a very quick and pleasant run down, arriving home safe and sound, having been away a full fortnight. It was a "great" experience, and made highly enjoyable by the fact that we had a reliable machine and good weather all the time.

To continue a detailed description of the tour would perhaps savour somewhat of repetition, but the foregoing will, I think, convey to the reader a fair idea as to the nature of motor cycling in this country. It will be realised, no doubt, why we want really waterproof magnetos, high ground clearance, sturdiness, and comfort.

M. M. THOMSON.



The photographs convey a good impression of typical Veldt country. The upper one shows the nature of the country in the neighbourhood of Maritzburg, and the lower, the district between Ennersdale and Estcourt. Note the watercourses in the road—these are frequently very deceptive as to their depth and consequently cause much trouble to travellers.

THE BUSINESS SIDECAR IN AUSTRALIA

SPEAKING of the business and pleasure sidecar, *The Motor in Australia* says: "A body made with detachable seat, side, and back would not be a difficult undertaking to manufacture, and no doubt if a sidecar of this description were placed on the market it would have a quick and ready sale." This type has already been marketed in England, and was described in our issue of November 16th, 1916, and several newspapers in this country employ sidecarriers which can be adapted as our contemporary suggests.

QUESTIONS AND REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Gear Ratio for a Lightweight.

I have a 2½ h.p. two-stroke motor cycle fitted with a two-speed gear, the top gear being about 5½ to 1, and the bottom gear 9½ to 1. As the country around is flat, do not you think this gear is too low? (1.) Would 4⅘ to 1 be too high, as I have a chain sprocket that would raise the gear to this? (2.) Should thick or thin oil be used for a magneto?—J.J.

(1.) We do not think the gear is too low, and we should say that any higher gear would be too high for this machine. It might take a higher gear in a still atmosphere, or when the wind is behind, but against the wind the present gear is likely to be more satisfactory. (2.) Thin oil should be used, and very little at a time.

Magneto Timing.

Can you give me any advice on the following? I recently bought a second-hand 8 h.p. twin Minerva. The engine was down for rebushing and was in good order. I have assembled it and find that the front cylinder runs well, but the back cylinder fires more often in the silencer. I have ground in the valves and fitted new springs with no better result. Can you tell me which is No. 1 cylinder in the Minerva? The magneto is marked I. and II. on the cams but I can find no marks on the cylinder to correspond, so fear I may have timed the engine on wrong cams. The machine seems to run all right except for the firing in the silencer of back cylinder.—C.H.

Make sure that there is the proper clearance between the valves and the tappets on the faulty cylinder. The symptoms you describe may be caused by one of the valves not quite closing, or again by an air leak in the induction system. Make all joints air-tight with seccotine so far as possible, then test by dripping oil on to them with engine running. If leakage is indicated by the oil being sucked in, bind joint with insulation tape. The rear cylinder is usually No. 1, but to confirm this rotate the engine slowly by hand until one of the pistons is at the correct firing point, then loosely connect up the magneto, points just breaking on cam No. 1. Rotate the engine still further until the other piston is on the firing point. If the connection is correct the contact points will now be on the point of breaking on the second cam, but if this is not so, reverse the positions of the high-tension wires and repeat the performance.

Petrol Supplies.

I should be very grateful for the benefit of your advice. I am a Colonial Government official home on leave; incidentally, I am a year late owing to having served in G.E.A. I want to take up motor cycling as usual for pleasure, *i.e.*, as a means of getting about to visit friends and relations. I should also like to take out wounded from the local hospitals. The difficulty, of course, is fuel. Can you give me any idea how to obtain this necessary commodity in sufficient quantities?—E.G.F.

We much regret that we cannot suggest any honourable means by which you might obtain petrol, and are afraid that, for the time being, you will be unable to do so. You might write to the Petrol Control Committee and fully state your case, but we are not very sanguine as to the results.

A Slipping Clutch.

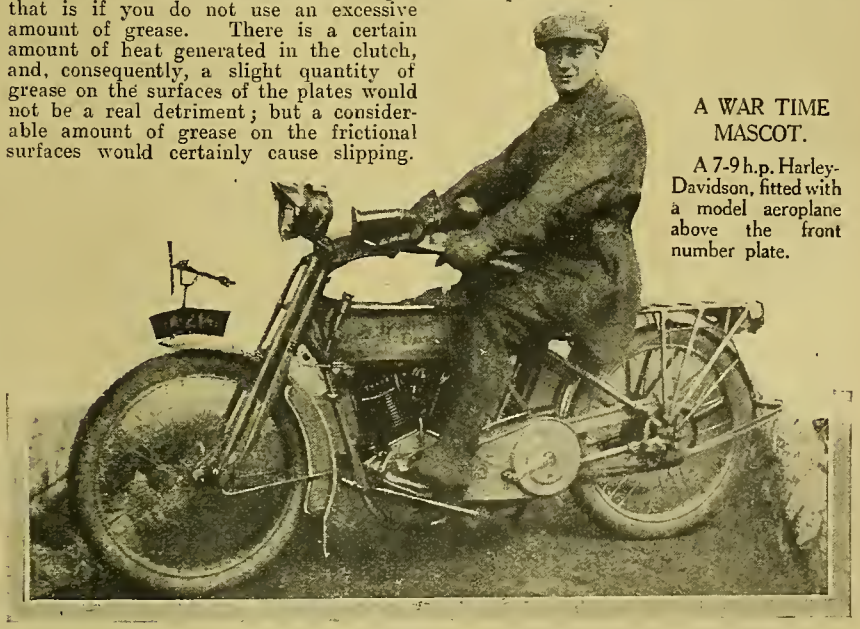
I have suffered recently from a slipping clutch on my 1916 W.D. Triumph. Do you think that this is due to the grease from the ball race, and, if not, what would cause the slipping, and how can I remedy it?—T.S.

We do not think that the very slight escape of grease working away from the ball race will cause the clutch to slip—that is if you do not use an excessive amount of grease. There is a certain amount of heat generated in the clutch, and, consequently, a slight quantity of grease on the surfaces of the plates would not be a real detriment; but a considerable amount of grease on the frictional surfaces would certainly cause slipping. It may be that it is coming from the chain. Have you been greasing this? A frequent cause of clutch slipping is in failing to allow a slight amount of play in the Bowden wire. Some riders adjust their clutches so that the lever is tight and there is no play whatever; as a result slipping is bound to occur, for the clutch does not really go home and engage properly.

Two Sparks in Two-stroke Engines.

Can you tell me if there is any advantage in using two plugs in a two-stroke engine for ordinary riding, especially when using substitute?—M.B.

By the use of a double-spark or two-spark systems, a two-stroke engine will turn over more rapidly, but there is an increased tendency towards knocking, especially when using substitutes. There is an advantage to be gained by the Lodge two-pole system, in that the plugs are not so likely to oil up, owing to the greater heat intensity of the sparks, but there is not much advantage to be gained by the use of a two-spark magneto for ordinary riding. You would gain nothing by connecting two plugs in parallel with an ordinary single-spark magneto, as the plug with the wider gap would probably make up with oil or carbon owing to its failure to spark at low speeds.



A WAR TIME MASCOT.

A 7-9 h.p. Harley-Davidson, fitted with a model aeroplane above the front number plate.

Petrol Permits.

Would you kindly advise me if it is a fact that private users will not be allowed to drive a motor cycle after this month except on proof that they are out solely on business? I am told this is so, in addition to the already existing regulation of "no petrol except for business."—T.B.P.

We know of no restrictions prohibiting the use of a motor cycle for any purpose, provided that the Petrol Control Committee has allotted you a supply of fuel. Possibly you know already that petrol substitutes must be entered on the petrol card.

Carrying a Petrol Permit.

Would you be kind enough to answer the following question for me, as I am at present uncertain how to act? I wish to ride my motor cycle, and have not got a petrol permit, as I do not require to buy any petrol at present, having some in stock; but I have been told that I am not allowed to ride the cycle without carrying a permit with me.—J.W.

There is no need whatever to carry a petrol licence on your person. Seeing that you have petrol, you are at perfect liberty to use it without interference until the stock is exhausted. The only object of carrying the licence is to enable you to purchase spirit on the road when it is available.

A Stopped Cheque.

I took an Auto-wheel and cycle to a firm to sell it for me. The firm sold it, and received a cheque in payment. The cycle was in perfect working condition when delivered to the selling firm, but the very first time the buyer took it out he had a smash up. He immediately cancelled payment of the cheque. The cheque was made out to me, but I would not accept it, and they paid me the money in notes. They put the cheque through in the ordinary manner, but, of course, it came back. I offered to pay commission, but the firm would not accept any, for, as they said, it was no trouble. In case the buyer persists in refusing to pay the agreed-on sum, who must be the loser? I sold the article, and have received payment for it, but the sellers cannot get their money. What is my legal position? On the supposition that I must pay them back the money for the cheque, cannot the selling firm be made to put the cycle in the same perfect condition as when received?—W.H.L.

We have submitted your query to our legal adviser, who replies as follows:

"I think the proper plan is for the firm who sold the Auto-wheel and cycle to sue the purchaser for the amount of the cheque. If the goods were in perfect working condition when delivered to the selling firm, I cannot see that your correspondent can be held in any way responsible; and if that firm can show that the cycle was in the same condition when they sold it, then the defendant would have to pay. I am, of course, presuming that the selling firm did not give any guarantee or make any representation they cannot substantiate."

Additional Gears.

Will you kindly answer me the following queries? I contemplate buying a P. and M. motor cycle, but should not feel confident with only two gears, and the bottom one only 9 to 1, as I am now running a three-speed Triumph. (1.) Would it be practicable to fit a two-speed hub to a P. and M., which, of course, would give four gears (gear in mind, the Millennium)? (2.) Would it be possible to convert a Sturmey-Archer three-speed hub into a simple two-speed by taking out the clutch and other unnecessary parts and having a special part made to carry the middle gear pinions and connect them with the hub shell? (3.) If so, could the chain wheel be screwed on in place of the belt rim? (4.) Would the gear be strong enough to bear the more rigid drive by chain on the P. and M.?—G.W.M.A.

If you are purchasing the P. and M. for solo use you would certainly find it powerful enough on its low gear to climb any hill permitting wheel grip. With a sidecar the need of a third gear is sometimes felt when negotiating very steep mountain ascents. (1.) We certainly would not recommend you to attempt to fit a hub gear, as the machine is not made for such a fitment. Probably very considerable alteration would be necessary, and conversions of this kind are seldom a success. Also it would entirely upset the balance of the machine, and it is doubtful whether you would obtain variations in ratio which would be of any real use to you. (2.) Such a conversion might be possible, but it would need highly skilled workmanship. Again, if the system were adopted, why not use the hub in its original state and obtain the possible advantage of two more speeds—six speeds in all—and an independent foot-controlled clutch? (3.) Yes; you would probably have difficulty in fixing the chain wheel and obtaining chain alignment. (4.) The transmission of a P. and M. is very smooth if the engine-shaft shock absorber be properly adjusted, and the gear should stand up to it.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

Engine Misfires when Hot.

I have a 2¾ h.p. 1915 Douglas model three-speed gear. When it gets hot it misfires badly, knocks going up a hill, and does not pull well. I have had the valves ground in, and they seem to be all right.—S.E.B.

We should recommend you to check the tappet and valve clearances carefully, and see that they are as close together as possible and yet allow the valves to close fully when the engine is warm. You might obtain an improvement by fitting new valve springs.

Oil Leakage.

How can I alter my crank case release? At present it blows out oil at the engine-shaft end through the pulley, throwing oil on my left foot. I have tried a guard, but without much success, as the oil vapour condenses. Could I put a release anywhere else in the crank case? I might say there is nothing in the engine-shaft, as I can push a piece of wire right through.—W.W.

You can partly plug the hollow crank-shaft and fit a relief valve in some convenient part of the crank case, but this should not be necessary unless you lubricate too liberally. You could arrange a tin shield for the oil fog to play upon.

Oiling a Magneto.

I should be very glad if you would answer the following queries: (1.) Should I (and, if so, how) oil a Splitdorf magneto? I see no sort of oiler. (2.) How can I prevent the rubber belt slipping on an 8 h.p. Zenith? Would a leather Whittle for wet weather be a great advantage? (3.) I have an F.R.S. magneto lighting set. Does it harm the magneto? As I use a lamp but rarely, would it not be simpler to run it off a dry cell solely?—M.L.

(1.) The Splitdorf magneto is provided with oil cups over the main bearings. It should be given two or three drops of thin oil every thousand miles. (2.) Excessive belt slip is generally due either to oil finding its way on to the belt or to a worn engine pulley. A leather belt would probably grip better than a rubber in wet weather, but unless given constant attention and kept very clean it would be apt to slip in dry weather. Also, it would wear the pulley more than a rubber belt. See that your belt is not unnecessarily exposed to drip from the back mudguard. (3.) The F.R.S. lighting set cannot harm the magneto. If you use lamps of low ampèrage a good dry cell would last some considerable time.

RECOMMENDED ROUTES.

WESTBURY TO NORTHAMPTON.—H.E.J.

Westbury, Devizes, Avebury, Swindon, Faringdon, Oxford, Kidlington, Bayards Green, Brackley, Towcester, Northampton.

BRIDLINGTON TO CLAY CROSS.—B.F.

Bridlington, Great Driffield, Market Weighton, Howden, Thorne, Doncaster, Tickhill, Worksop, Chesterfield, Clay Cross. The total distance is approximately 107 miles.

MARCH TO ECCLES.—R.H.

March, Peterborough, on to the Great North Road, then through Stamford, Oakham, Melton Mowbray, Loughborough, Derby, Ashbourne, Leek, Congleton, Holmes Chapel, Knutsford, Mere Corner, Altrincham, Eccles.

BRISTOL TO BEXHILL.—F.J.B.

Bristol, Bath, Warminster, Heytesbury, Wilton, Salisbury, Landford, Ower, Totton, Southampton, Fareham, Havant, Chichester, Arundel, Broadwater, Old Shoreham, Brighton, Lewes, Polegate, Pevensey, Bexhill.

British Goods for Britishers

IT IS A FACT that British tyre manufacturers are in a position to supply all tyre needs, governmental, industrial, and civil.

It is an unfortunate fact, though, that there are quite appreciable numbers of tyre users who, not recognizing this, continue to buy imported tyres.

It should only be necessary to reiterate that there ***are*** plenty of British tyres to be obtained, and to submit the accompanying list of 16 all-British makes, to prompt every British user of tyres to buy only British tyres.

ALMAGAM	LEYLAND
AVON	MACINTOSH
BATES	MIDLAND
BELDAM	MOSELEY
NORTH BRITISH	PALMER
CLINCHER	SPENCER-MOULTON
DUNLOP	ST. HELEN'S
HENLEY	WOOD-MILNE
KEMPSHALL	

Quick!

Can You Trust Your Tyres?

IT is not a question of trusting your brakes—the best brakes in the world won't help you if your tyres do not grip. If both wheels of your motor cycle are fitted with All-British

BELDAM
V STEEL STUDDED

tyres you are prepared for every emergency. The rubber tread and steel *studs are both on the same level*—you have an "all-rubber grip" and a "steel-studded grip" on each wheel The tread is crisp and narrow and has a splendid side grip too which saves you when "cornering." No skidding, no spinning wheels, and a perfect hold of the road.

Write for prices—

The Beldam Tyre Co., Ltd., Brentford, Middlesex.

New Zealand: J. E. Fitzgerald, 139, Lambton Quay, Wellington. Cape Colony: The Tyre and Motor Co., Rodney Street, Port Elizabeth. India: Wilkinson & Co., 7, Old Court House Street, Calcutta. Ireland: P. Drohan & Sons, Carrick-on-Suir.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

☞ DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Spares; prompt delivery — Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305

1916 4h.p. 3-speed A.J.S., as new; £65, no offers. —7, Norfolk St., King's Lynn, Norfolk. [2321

LATE 1914 6h.p. 3-speed A.J.S., and sidecar, exceptional condition; £54, a bargain.—Else, Daisy Bank, Matlock. [X9698

1916 4h.p. A.J.S., 3-speed, kick start, condition as new, Lucas lamps and horn, complete.—Pickering, Mardol, Shrewsbury. [X9219

1914 A.J.S., 5-6h.p., 3-speed, coachbuilt A.J.S. sidecar, all accessories, 6 gallons of petrol.—Lieut. Walters, c/o Dan Guy, Weymouth. [2084

1914 (late) 6h.p. A.J.S. Combination, hood, curtains, Lucas lamps, etc., good condition; £55, no offers. —Canty Crocken Hill, Swanley, Kent. [2121

A.J.S. Coachbuilt combination, 6h.p., 3 speeds, 1914, enclosed chain drive, in 1916 condition; £55.—Percy and Co., 337, Euston Rd., London. [2345

A.J.S., 6h.p., late 1914, 3-speed, tyres only done 50 miles, Cowey speedometer, 5 gn. model Lucas horn, tools, 2 retreaded tyres not used; price 55 gns.; excellent condition.—Bailey, Maidens Green, Winkfield, Bracknell, Berks. [2105

Alldays.

ALLDAYS Allon, new, first cheque £42 secures.—Clifford's Garage, Sidcup. 'Phone: 4. [2181a

FORWARD Fasteners

are among the little things that make big impressions.

Like FORWARD PLUGS, they give exceptional service — service which entirely obviates all those little irritating roadside adjustments and repairs.

The patterns illustrated are:

THE FORWARD 1/6

THE KING HOOK

Detachable 1/-

Adjustable 1/3

THE CHAMPION

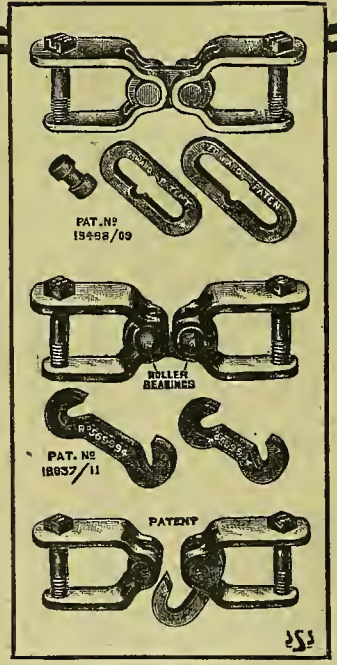
Detachable .. .. .. 9d.

Adjustable 1/-

Write for List.

FORWARD MOTOR Co.

35, Forward Works, Summer Row, BIRMINGHAM.



Petrol & Oil Tanks

Specialists in highest grade tanks. Satisfaction guaranteed. Trade enquiries solicited.

Auxiliary tanks stocked in 3 sizes, with filler, tap, clips, T piece, and piping from 6/6.

A. GREEN, Water St., Blacktriars, Manchester.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0794

RIDER TROWARD'S, 78, High St., Hampstead.—1916 Allon, 2-speed, 2-stroke; 29 gns. [2284

ALLON, 1916, 2-speed, handle-bar clutch; £36.—Phillips, Excise Officer, Queensbury, Bradford. [X9670

1916 Alldays Allon, 2-speed, 2-stroke, hand clutch, electric head and tail lamps, oversize back tyre, everything in good condition, fast, and reliable; £34.—H. Bull, 98, Westcombe Hill, Blackheath, S.E. [2076

Ariel.

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

ARIEL, 3½h.p., T.T., 1915, like new, very fast; £38.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [2154

ARIEL, 3½h.p., semi T.T., with variable pulley gear; worth easily £25, will accept £20; approval with pleasure.—Laytons' Garage, Bicester, Oxon. [2271

ARIEL (Sept., 1916), 3½h.p., 3-speed countershaft, kick starter, C.B. sidecar, splendid condition, not done 500 miles; £65, and petrol; Manchester.—Box 888, c/o *The Motor Cycle*. [X9724

ARIEL, 1914, T.T., new inlet and exhaust valves and springs, new piston rings, belt, and back tyre, large Rushmore head lamp, Stewart speedometer, horn, very good condition, little used; £28.—Apply by letter, Pater, Beddington House, Croydon. [2089

Auto-Wheels.

AUTO-WHEELS (two), first-class condition; £8 each.—42, Upper Thames St., E.C. [2125

AUTO-WHEEL, perfect running order; £6/15.—94 St. Thomas Rd., Erdington, Birmingham. [X9738

GENUINE Wall Auto-Wheel, little used, new condition; £8/10.—Murray, 37a, Charles St., Hatton Garden, Holborn. [X9713

AUTO-WHEEL, B.S.A. Model, ridden scarcely 100 miles, £12/12; also standard model, 1914, £6/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [2152

Bat.

1916 6-8h.p. Bat-Jap Combination, equal to new, 3-speed countershaft; best offer over £50.—Box L3,588, c/o *The Motor Cycle*. [2160

Blumfield.

BLUMFIELD (late), 5-6h.p. twin, mag., new Dunlop tyres; £19/19.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [2141

Bradbury.

RIDER TROWARD'S, 78, High St., Hampstead.—1913 Bradbury, 3-speed; 24 gns. [2285

BRADBURY, 4h.p., 1913, free engine, very little used, like new; £28.—6, Arsenal Rd., Well Hall, S.E.9. [2188

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage; £49/10.—Motor Exchange, Horton St., Halifax. [1856

BRADBURY, 3½h.p., spring forks, Bosch mag., in good order; £12/10.—Percy and Co., 337, Euston Rd., London. [2354

BRADBURY 4h.p. Combination, N.S.U. 2 speeds, in good condition; bargain.—After 7, 53, Denmark Hill, Camberwell. [2204

MOTOR CYCLES FOR SALE.

Bradbury.

1913 3½h.p. Bradbury, Bowden 2-speed gear, kick starter, tyres good, all accessories; £23/10.—Blake, 216, Westbourne Grove, W.11. [2206

4h.p. Bradbury Combination, coachbuilt sidecar, variable pulley, splendid condition; £25.—Murray, 37a, Charles St., Hatton Garden, Holborn. [X9711

Brough.

1915 3½h.p. Brough, 2-speed countershaft, flat twin, little used, total mileage 2,153, Miller lamp, horn, cowls, footboards, perfect condition; £45.—F. Collins, 44, Kingston Rd., Dartmouth. (T) [2304

B.S.A.

COLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A. Model de Luxe Auto-Wheel, very little used; £9.—Bray, Joy St., Barnstaple. [X9755

B.S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888

1914 B.S.A. Coachbuilt Combination, tyres good; £27, bargain.—163, Loughborough Rd., Brixton. [2190

B.S.A., 4½h.p., 1915½, neat coach sidecar, first-class condition; £50.—133, Archway Rd., Highgate. [2203

B.S.A., 2-speed, 1913, just overhauled by makers; £37.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [2155

LATE 1913 Clutch Model B.S.A., splendid order, little used; sell cheap, or exchange lightweight.—436, Whitehorse Rd., Thornton Heath. [2221

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529

1916 B.S.A., 4½h.p., fitted with new Millford commercial, good condition throughout; 55 gns., or separate; consider good lightweight part.—Rose, Booth St., Ripley, Derby. [X9730

B.S.A., Oct., 1916, 4½h.p., Model K, with 12 gn. Watsonian sidecar, 3 lamps, Stewart horn and speedometer, guaranteed mileage under 900, £71; exchanges, deferred payments.—Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N. [2147

RIDER TROWARD'S, 78, High St., Hampstead.—1917 B.S.A., 3-speed, chain-cum-belt, mileage 500, 55 gns.; 1915 chain-cum-belt coachbuilt combination, 49 gns.; 1914 chain-driven coachbuilt combination, 3-speed, 39 gns.; 1913 2-speed, 29 gns.; all guaranteed to run on neat paraffin.—'Phone: 5392. [2286

1917 New 4½h.p. B.S.A., Model K, 3-speed, and clutch motor cycles for immediate delivery from stock, £64; also unique selection of second-hand B.S.A. 4½h.p. models, 1915 and 1916, at low prices to clear; extended payments arranged; special low prices for cash.—Wauchope's, B.S.A. City Agents, 9, Shoe Lane, Fleet St., London. [2308

Calthorpe.

CALTHORPE 2-stroke, nearly new; £25.—Harrison, 28, High St., Staines. [2078

COLMORE Depots, Birmingham, Manchester and Liverpool, for Calthorpe motor cycles. [0799

CALTHORPE-J.A.P., 1917, latest model, brand new, Enfield 2-speed; in stock; 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [2132

CALTHORPE, 2-stroke, 1917, latest model, Enfield 2-speed; 33 gns.; brand new.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [2134

CALTHORPES, new 1917 models, J.A.P. engines, Enfield gears, £39/18, cash, easy terms, or exchange.—Wauchope's, 9, Shoe Lane, London. [2309

CALTHORPE-J.A.P., 1916, 2¾h.p., Enfield 2-speed, fully equipped, and perfect, not done 500 miles; what offers?—Trevers, Colin Park, The Hyde, Hendon. [2319

CALTHORPE, 2¾h.p., 2-stroke, 2-speed, new Dec., 1915, only used 6 months, perfect condition, lamps, tools; £26.—Bernardes, 17, Ommaney Rd., New Cross. [2201

CALTHORPE, 2-stroke, new, but slightly shop-soiled, Enfield 2-speed; special bargain, 28 gns., usual price 33 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [2135

CALTHORPE-J.A.P., new, but slightly shop-soiled, Enfield 2-speed; special bargain, 31 gns.; usual price 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [2133

CALTHORPE, 1916, 2½h.p. J.A.P., Enfield 2 speeds, speedometer, lamps, almost new, £31; another, 1915, 2½h.p. J.A.P., Enfield 2 speeds, £23.—Percy and Co., 337, Euston Rd., London. [2341

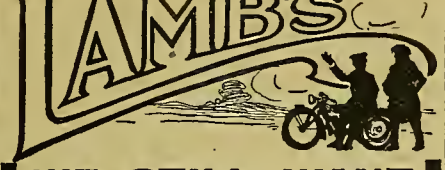
Campion.

1915 Campion-Precision, 2½h.p., 2-speed, little used; £20.—Bainee, South St., Oakham. [X9691

1917 Campion, Villiers engine, 2-stroke, 2-speed, 2 months old; £35.—Major Gotley, F Mess, Belton, Grantham. [X9744

Century.

CENTURY, 2¼h.p., £14; new condition, economical, and quick, reliable little machine, all accessories.—Douilliez, 19, Tryon St., Chelsea, London. [2092



WE STILL WANT

first-class Combinations in good mechanical order. Owners desiring to sell should bring proof of ownership when calling with machine. Fair prices paid immediately for right goods.

NOW ACTUALLY ON SHOW.

HARLEY-DAVIDSON, 7-9 h.p., Standard Combination £115 10
HARLEY-DAVIDSON 7-9 h.p. Combination, electric equipment £126 10
HARLEY-DAVIDSON 7-9 h.p. sporting Combination £117 10
B.S.A., 4½ h.p., belt-cum-chain model £64 0
B.S.A., 4½ h.p., all-chain £66 0
ENFIELD, 2¼ h.p., 2-sp., 2-stroke £44 2
LEVIS, 2½ h.p., 2-sp., Enfield gear, rustless rims £47 10
LEVIS, 2½ h.p., Popular model £32 0
ALLDAYS ALLON, single-speed, 2½ h.p. .. £37 16
ALLDAYS ALLON, 2-speed, 2½ h.p. £44 2
ALLDAYS ALLON, 2-speed, clutch, 2½ h.p. £47 5
(9 models in Stock).
CALTHORPE-J.A.P., 2¾ h.p., 2 sp., 3 in stock £39 16
NEW HUDSON, 2½ h.p., 2-sp. Model C .. £28 0
ARIEL, 3½ h.p., 3-sp., k/start, solo mount £72 0
ROYAL RUBY, 2½ h.p., single-speed £40 0
ROYAL RUBY, 2½ h.p., 2-speed £47 5
ROYAL RUBY, 2½ h.p., 2-sp. J.A.P. £46 0
(7 in Stock).
HARLEY-DAVIDSON, 7-9 h.p., 1916, Com.-H.-D. bulbous back Sidecar £105 0
ROVER, 3½ h.p., 3-sp., c/shaft, kick-start £73 10

SECOND-HANDS.

JAMES, 4½ h.p., 1915, 3-sp., k/start, 3 lamps, horn £57 10
REX, 6 h.p., 1913, twin, coach Combination £36 10
NEW HUDSON, 4 h.p., late 1913, N.H. Sidecar, speedometer, lamp, and horn £39 10
T.D.C. de Luxe, 1916, 2½ h.p., 2-sp., original tyres bargain £25 0
ROVER, 3½ h.p., 1913, Philipson pulley, 2 lamps, horn £35 0
P. & M., 3½ h.p., 1913, twin, 2-sp. gear, all access. £33 10
JUNO-VILLIERS, 2½ h.p., 2-sp., 1916, all accessories, mileage about 100 ..... £30 10
ALLDAYS ALLON, 2½ h.p., 1916, single-sp., and accessories £25 0
AUTO-WHEEL, 1 h.p., B.S.A. model, only soiled £12 12
RADCO, 1914, single-speed £18 10
O.K.-JUNIOR, 2½ h.p., 1916, 2-sp., only shop-soiled, and accessories ..... —
CALTHORPE-J.A.P., 2¾ h.p., 1916, 2-sp., all accessories £24 10
B.S.A., 3-sp., Model K., 4½ h.p., ridden only 800 miles, speedometer, Lucas lamp, Stewart horn, and Watsonian Sidecar, quite like new. £71 0
LINCOLN-ELK, 1913, 2-sp., k/start, with lamp and horn £24 0
ENFIELD, 6 h.p., 1915 (late), dyn. lighting outfit, hood and screen, speedometer, original tyres still on ..... —
ENFIELD (2) Box Carriers, each £15 15
ENFIELD, 3 h.p., 1916, 2-sp., k/start, 2 lamps, and horn £47 10
CALTHORPE, 2-str., 1915, single-speed .. £19 19
JUNO-VILLIERS, 1916, 2½ h.p., single-sp., Bosch magneto, 2 h.p., and horn ... £23 10
TRIUMPH, 1913, 3-sp., clutch, all access. £37 10
TRIUMPH, 1913, 3-sp., clutch, all access. £35 10

SIDECARS.

Indian-Cancelet, suit 5 h.p. machine £15 15
Watsonian. All models in stock from £9 2s. 6d. to £14 14
Phœnix (2) Standard Sidecars, each £7 10
Rudge Sidecar, 1915, in fine preservation £14 14
Phœnix Cigar, cane £8 8
Phœnix-Indian, 7-9 h.p. £15 15
Enfield, 1914, coach Sidecar, in good order £10 10

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LIBERAL EXCHANGE.

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151, HIGH ST., WALTHAMSTOW, E.17.
'Phone: Walthamstow 169.
5 minutes Hoe St. (G.E.R.)

And 50, HIGH RD., WOOD GREEN, N.22.
(Only depot in this district).
'Phone: Hornsey 1956.
Hours—9 to 8-30.
Thursdays, 1 o'clock.

MOTOR CYCLES FOR SALE.

Chater-Lea.

CHATER-LEA, 5h.p. twin Peugeot, Bosch mag., in nice condition, with sidecar; £14.—Percy and Co., 337, Euston Rd., London. [2355

Chater-Lea-Jap.

8h.p. Chater-Lea-Jap, 1916 model, 3-speed countershaft gear, and free engine plate clutch, handle starting, fitted with coachbuilt tandem seated sidecar, Pillion seat on back carrier, an ideal 4-seater combination, complete with all accessories, condition as good as new, includes screen, storm apron, not ridden above 500 miles; 75 gns.; guaranteed.—Wauchope's, 9, Shoe Lane, Fleet St., London. [2307

Clyno.

CLYNO 1912 6h.p. Combination; £35/10.—Motor Exchange, Horton St., Halifax. [1858

2¾h.p. Clyno, 2-stroke, 2-speed; £22/10; guaranteed.—Wauchope's, 9, Shoe Lane, London. [2312

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

6h.p. Clyno Combination, 3 speeds, 3 heavy new Dunlop tyres, spare wheel, hood, screen, etc., all in good condition; £50.—Bond, Sun St., Waltham Abbey, Essex. [X9556

6h.p. Clyno Combination, 3-speed countershaft gear, detachable wheels, magnificent turnout, 70 m.p.g. guaranteed; any trial; sacrifice £52; take fast solo machine part.—Else, Dimple, Matlock. [X9732

Coventry Eagle.

COVENTRY Eagle 1916 Twin, sidecar combination, 3-speed countershaft; £69/10, or exchange for Morgan.—Holdsworth, 22, Belvoir Gardens, Halifax. [1857

COVENTRY Eagles.—Several of these well-known reliable models in stock for cash, or on easy purchase terms.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [2108

De Dion.

DE DION Motor Cycle and Sidecar, B.B., mag., perfect, good tyres.—72, Beechfield Rd., Tottenham. [2324

Diamond.

DIAMOND Spring Frame De Luxe, 2¾h.p., 1917, Chater-Lea 2-speed, Mark II. forks, 26×2¼ tyres, as new; £37/10.—50, Tettenhall Rd., Wolverhampton. [X9743

Douglas.

DOUGLAS, 1915, 2¾h.p., T.T., 2 speeds; £40.

DOUGLAS, 1914, 2¾h.p., T.T., 2 speeds; £35.

DOUGLAS, 1913, 2¾h.p., 2 speeds, lady's; £30.

DOUGLAS, 1912, 2¾h.p., 2 speeds, T.T.; £26.—Percy and Co., 337, Euston Rd., London. [2350

2¾h.p. Douglas Motor Cycle; £22/10.—Wauchope's, 9, Shoe Lane, E.C. [2314

1917.—Gibb, Douglas Expert, Gloucester, for earliest deliveries of The Motor Cycle. [X8510

DOUGLAS 1912 2¾-3h.p. Twin, mag., 2 speeds; £23/10.—1, Ebner St., Wandsworth. [2142

RIDER TROWARD'S, 78, High St., Hampstead.—Douglas, 1913, T.T., 2-speed; 26 gns. [2287

DOUGLAS, 1915, T.T., lamps, etc., as new; £38.—51, Maplethorpe Rd., Thornton Heath. [2234

DOUGLAS, about 1911; £13, offers; must sell.—Smith, Gas Works, Raunds, Northants. [2103

1914 2¾h.p. T.T. Douglas, 2-speed, long exhaust pipe; £34.—18, Ranelagh Av., Barnes. [2212

DOUGLAS, 1913, 2-speed, Dunlop studded tyres; £30.—Orchin, 22, Adys Rd., East Dulwich, S.E.15. [2128

DOUGLAS, 1914¾, 2-speed, clutch, kick, accessories, new condition; £37/10.—77, Hammersmith Rd., W. [2166

DOUGLAS, 1914, 2¾h.p., 2-speed, clutch, Model W, good condition.—Apply, Dr. Bailey, Bourne End, Bucks. [X9741

DOUGLAS, 1914, 2¾h.p., 2-speed countershaft gear, good condition.—Motor Exchange, Horton St., Halifax. [1860

1915 Douglas, 2¾h.p., Colonial Model, lamp and horn; bargain, £44.—George, 23, South Parade, Chelsea. [2210

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Yeovil. Tel.: 50. [5855

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

1914½ 2¾h.p. T.T. Douglas, 2 speeds, good tyres, accessories, fast, and in perfect condition; £37/10.—40, Station Rd., Barnes, S.W. [2164

DOUGLAS, 1913, 2¾h.p. Model V, T.T. handle-bar, thoroughly overhauled, new appearance, with accessories; £32/10.—Eagles and Co., High St., Acton, W.3. [X9746

DOUGLAS, late 1915, 2¾h.p., 3-speed, clutch, kick starter, semi-T.T. bars, accessories; £46; exchange entertained.—F. J. P. Disney, East Molesey, Surrey. [2232

MOTOR CYCLES FOR SALE.

Douglas.

1915 2¾h.p. Douglas W, clutch, kick start, 3-speed, nearly new Dunlops, upturned bars, footboards, perfect condition; £42.—Robinson's Garage, Green St., Cambridge. [2278

DOUGLAS, 1915, 2¾h.p., 3 speeds, Stewart horn, lamp and generator, £40; or with new light G.K. sidecar, storm cover, etc., £48; trial run.—64, Colombo Rd., Ilford, Essex. [2196

1914 Douglas, 2-speed, clutch, and kick starter, tyres and belt nearly new, engine in perfect running order, 8 gals. petrol given; £35.—Benfield, Wateringbury, Kent. [2275

DOUGLAS, 2¾h.p., 1916 W.D., 2-speed, with footboards, Lucas lamps, 2 generators, College mudshield, mechanical horn, used one month, as new; £50.—11, Blenheim Sq., Leeds. [X9723

1915¾ 4h.p. Douglas Colonial 3-speed Combination, C.A.V., P. and H., Lucas, special 3-jet Binks, polished aeroplane exhaust, has run only 1,600 miles; £62.—Apply, Box L3,585, c/o *The Motor Cycle*. [2114

DOUGLAS, late 1913, 2¾h.p., mechanically sound, lamps, good tyres and belt, bargain, £25; also Levis, 1915, 2¼h.p., new tyres and belt, mechanical horn, £20.—Warren, 121, Trinity Rd., Upper Tooting, S.W.17. [X9554

DOUGLAS, 1912-13, 2-speed, T.T., new tyres and belt, long exhaust, very fast, recently overhauled, guaranteed perfect condition, all accessories; genuine bargain, £25.—Godolphin, Bungalow, Blackhouse, Peterhead, N.B. [2171

DOUGLAS Motor Cycles for delivery within 7 days to doctors, farmers, or others that require them for work of National importance.—Eli Clark, The Pioneer Agent, Leader Depot, 223, Cheltenham Rd., Bristol. 'Phone: 4169. Wires: Ignition, Bristol. [X9692

2¾h.p. Douglas, latest models, including W, clutch, kick start, U touring, V racing; special arrangements to supply doctors and farmers immediately against Minister Munitions certificate.—Full particulars and how to obtain them, Robinson's Garage, Green St., Cambridge. [2279

DOUGLAS, 1911, 2¾h.p., 2-speed, free engine, crank, crankcase, piston rings, and tyres, new in January, lamps, and tools, etc.; bargain, 22 gns., or nearest offer; must sell; owner joining army.—Box L3,590, c/o *The Motor Cycle*. [2329

A RARE Opportunity.—1915 Colonial 3-speed 2¾h.p. T.T. Douglas, absolutely as new, and unscratched, with all accessories, P. and H. head lamp, Lucas rear, Jones trip speedometer, horn, tools, etc.; this machine has only been ridden few miles, and is a genuine bargain; must be sold this week; £48, lowest.—Apply, Amber House, Gloucester Rd., Chesterfield. [X9709

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012

EDMUND-J.A.P., spring frame, 2-speed, chain drive, ridden 600 miles, as new; cost £52, accept £42; good 2-stroke part.—1, Marlborough Grove, Rhyl, N. Wales. [X9739

EDMUND-J.A.P., 2½h.p., 2 speeds, the wonderful spring frame machine. We can deliver from stock; price 50 gns.; detailed list free.—The North Wales Motor Exchange, Holt St., Wrexham. [X8755

Elswick.

1915 Elswick, 2½h.p., 2-speed, free engine, speedometer, splendid condition; £22/10, near offer.—73, Godwin Rd., Forest Gate, E.7. [2213

Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2¼h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

ENFIELD Combination, 1912, cane sidecar.—Motor Exchange, Horton St., Halifax. [1859

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

ENFIELD, '917, 3h.p.; 55 gns.; brand new.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [2130

ENFIELD, late 1916, 6h.p. combination, slightly shop-soiled; what offers?—Stour Cycle Depot, Stourbridge. [X9710

ENFIELD Twin, 2½h.p., mag.; £14, bargain; ride away.—Mrs. Holt, 3, Durban Place, Alfreton Rd., Nottingham. [X9728

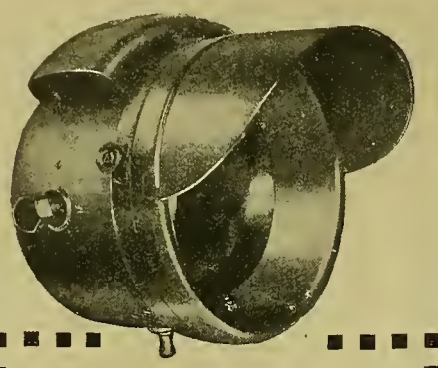
ROYAL Enfield 2¾h.p. Twin Lightweight, just been overhauled; bargain, £12.—97, Longhurst Rd., Lewisham, S.E. [2283

ENFIELD 1917 6h.p. Combination; 90 gns.; brand new.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [2129

ENFIELD, late 1915, 2¼h.p., 2-stroke model, 2 speeds, chain drive, fine condition; £28/10.—Eagles and Co., High St., Acton, W.3. [X9747

ENFIELD Combination, 6h.p., 1914, Bosch mag., lamps, in fine order; £45.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [1795

ENFIELD Combination, 1915, 6h.p., lamps, horn, wind screen, good condition; £60.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0481



The Most Powerful Motor Cycle Lamp made

—but not the most expensive.

This Bleriot Motor Cycle Lamp is made of solid brass, nickel-plated finish, and has a genuine lens mirror combined with parabolic reflector so fixed that the light is thrown a long way ahead as well as on both sides of the road. Fits standard brackets. Quality and efficiency are of Bleriot standard, i.e., the best.

Write for Price List.

BLERIOT

Ltd.

58, Long Acre, London, W.C.

Godbolds.

TO REMOVE THAT BLOT

FROM YOUR MOTOR CYCLING PLEASURE

YOU SHOULD FIT THE FAMOUS

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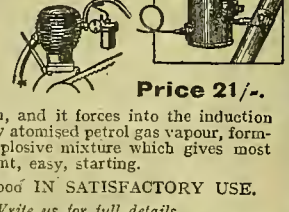
EASY STARTER,

WHICH DOES AWAY WITH EVERY STARTING DIFFICULTY

IT FITS ANY MOTOR CYCLE, AND CAN BE ATTACHED IN 10 MINUTES.



It never fails whether you are running on pure petrol or any substitute.

Price 21/-.

Only a touch, and it forces into the induction tube a highly atomised petrol gas vapour, forming a rich explosive mixture which gives most perfect, instant, easy, starting.

OVER 33,000 IN SATISFACTORY USE.

Write us for full details.

ALEXANDERS

Dept. B, 115, Lothian Rd., EDINBURGH.

MOTOR CYCLES FOR SALE.

Enfield.

BRAND New 1917 Enfield, 2½h.p., 2-stroke, with lamp, etc.; £42, or exchange for higher powered modern machine.—Haines, 11, Rokeby Av., Bristol. [X9631

ENFIELD, 1917, 2-stroke, £44/2, brand new. We are Enfield specialists; immediate delivery; all models in stock.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [2131

ENFIELD Combination, 1916, in excellent condition, fully equipped, and equal to new; great bargain, £75.—Longman Bros., King St., Acton, W.3. 'Phone: 1578 Chiswick. [2253

8h.p. 1916 Royal Enfield Combination, almost new, done under 500 miles, complete with all accessories; any severe trial given; price £79; guaranteed.—Wauchope's, 9, Shoe Lane, London. [2315

ENFIELD 6h.p. Late 1916 Combination, electric lighting, fitted for substitute, Pillion seat, all spares new and unused, including tyre, 700×80; £79.—Baxter, 34, Abbots Rd., King's Heath. [X9685

ENFIELD Combination, 1916, 6h.p., Euk starter, runs on substitute, Gloria horn, acetylene lamps, handle-bar mirror, watch, muffs, Pillion seat, child's seat in sidecar, tyres and condition excellent, used week-ends; £75.—Brammall, 12, Ryde Vale Rd., Balham, S.W.12. [X9205

ENFIELD 2¼h.p. 2-speed Lightweight, £44/2; also 1915 (June) 6h.p. Enfield, dynamo lighting, hood, screen; also 1916 3h.p. Enfield, 2-speed, kick starter, and accessories, £47/10; deferred payments if desired.—Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N. [2149

ENFIELD Combination, 6h.p., practically new, having only run about 400 miles, complete with Lucas head and rear lamps, generators, Lucas horn, Jones speedometer, luggage carrier, tools, etc., as delivered from works, absolutely unscratched; £95; easy purchase terms if desired.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [2110

Excelsior.

3½h.p. Excelsior, Bosch, Druids, good order; £10, offers; enlisted.—Ballard, 7, Fairfax Rd., Hampton Wick. [2168

SPECIAL Offer of 1916 2½h.p. 2-stroke Excelsior motor cycle, in good running order; £16, bargain.—J. Mitchell, 16, Meadow Rd., Rusthall, Kent. [2304

EXCELSIOR (American), 7-9h.p., 1916 type, 3-speed, kick start, etc.; offered at the ridiculous price of £45. Come along, boys. You can easily resell this lot at a profit.—Laytons' Garage, Bicester, Oxon. [2266

BRAND New Latest Model 7h.p. 3-speed American Excelsior, with kick starter on right-hand side, mechanical lubrication, dual control to clutch, 2 brakes on rear wheel, and all other improvements, complete with special Montgomery coachbuilt sidecar, enamelled to match; £90; immediate delivery, liberal exchanges; carriage paid to any address.—To be obtained only from the Premier Motor Co., Aston Rd., Birmingham. [2224

Forward.

FORWARD 2½h.p. Twin, spring forks, mag. ignition, in real good order and condition; a bargain, £10/10.—Percy and Co., 337, Euston Rd., London. [2353

F.N.

7-9h.p. F.N., 1914, mechanical valves, 3-speed, Bosch, Zenith carburetter, and coachbuilt sidecar; £65.—Smith, 16, Haverstock Hill, opposite Chalk Farm Tube Station. [1794

F.N., 1913, 6h.p., 4-cyl., enclosed Bosch, 2 speeds (dropped frame), nice condition; only 28 gns.; exchanges entertained.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [2140

Grandex.

RIDER TROWARD'S, 78, High St., Hampstead.—Grandex-Precision, 1917, 4h.p., T.T., brand new; 29 gns. [2288

Harley-Davidson.

SHOP-SOILED 3-speed Harley-Davidson Combination, quite new; £90.—T. Gillatt, Church Gate, Loughborough. [X9718

COLMORE Depot, Birmingham, Manchester, Liverpool, Leicester, for immediate delivery of all models of Harley-Davidsons, and spare parts. [0802

LATE 1915 Harley-Davidson Combination, fully equipped, excellent condition, £80; cash or easy terms.—R. E. Jones (Garages), Ltd., Swansea. [0861

HARLEY-DAVIDSON, 1915, 7-9h.p., 3-speed, and sidecar, with hood, screen, speedometer, Lucas lamps, horn, etc., magnificent outfit, as new in every way; £75.—Below.

HARLEY-DAVIDSON, 1915, 7-9h.p., 3-speed, and sidecar, lamps, horn, speedometer, in very good condition throughout; £68.—Below.

HARLEY-DAVIDSON, 1915, 7-9h.p., 3-speed, in sound mechanical order; £40.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0551

HARLEY-DAVIDSON, 7-9h.p., late 1915, 3 speeds, dynamo lighting set, electric horn, Millford Empress sidecar, with wind screen; £65.—Eagles and Co., High St., Acton, W.3. [X9748

THE Last One.—Brand new Model 11F 7-9h.p. 3-speed Harley-Davidson, Bosch mag. ignition, complete with special Montgomery spring frame American model sidecar, enamelled to match; £90; do not miss this opportunity.—The Premier Motor Co., Aston Rd., Birmingham. [2225

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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South Africa—Central News Agency, Ltd. Paris—Smith's English Library, 248 Rue Rivoli.

Disadvantages of a Long Magneto Drive.

DURING the last few weeks we have described and illustrated a number of different makes of British-made motor bicycles intended for the use of our Russian Ally. The observant reader will notice that, in reviewing the features of the machines, we have had occasion to mention one or two unusual and questionable points of design. It should be explained here that the manufacturers whose works are engaged upon these Russian Government orders have to conform to a specification, and consequently any criticism of unusual features cannot fairly be applied to the manufacturer who is carrying out these orders. Indeed, we know that in certain instances, features about which the maker himself was by no means enthusiastic have had to be incorporated in the design. Rightly or wrongly, the Russian Government has stipulated in the case of certain twin-cylinder machines that the magneto is to be fitted at the rear of the engine, yet machines with magnetos in front have been used in every form of competition and in almost every country with success. If the rearward position is intended to screen the magneto from the wet, all we can say is that a cover would be just as efficacious. If it is to prevent it being clogged with snow in deep drifts, we are convinced that there are other parts of the machine which would give in under such conditions before the depths of snow obscured the magneto, and here again a cover would meet the case. But after all, is not the disease to be preferred to the cure? The alternatives are to fit the magneto (1) in front of the seat tube, or (2) at the rear of it. Obviously, if accessibility is not impaired and the magneto is not heated too much, the position in front of the seat tube is to be preferred when there is sufficient clearance, as it brings closer together the driving centres for the magneto Every novice knows that a long chain is a disadvantage, particularly in the case of a magneto transmission, for the chain must stretch, it will rattle against the interior of the casing, but above all it will cause a lag in the timing and an unaccountable (to a novice) falling off in engine power. Moreover, chain makers are agreed that chains should invariably be fitted in a horizontal position or as near to this as is practicable. The drive should be short, and it is preferable that the top part of the chain should be in tension and the lower part slack. We hazard the opinion that our Russian comrades who are to handle these machines would be far more likely to keep a magneto clean if it were properly encased in a protecting cover than they would be to retime an engine which had been retarded due to chain slackness. Again, a long chain when slack is much more liable to slip off the sprockets than a short chain, and we would not be at all surprised to hear of this trouble later on. The item we are criticising is not the only one in respect to the design of the motor cycles for these Russian orders, and the fact that one maker is permitted to supply his standard equipment and another compelled to make a change is unaccountable to many. British manufacturers have had incomparable experience in the production of motor cycles, and have gradually perfected a design which has proved its ability to give satisfaction in any country and over any road, yet they are dictated to by officials whose experience cannot possibly compare with that of home producers, and are compelled to make departures from a satisfactory design to something untried rather than suffer the alternative of losing the order.

There is another extraordinary point about the Russian orders which we cannot well refrain from mentioning, and that is the delay of many weeks which occurred in distributing the orders, followed by the issue of large demands, quick delivery dates named, and certain special details included in the specification which hardly gave our manufacturers a chance.

An index to the advertisements in this issue will be found on the page facing the back cover.

IDEAS: Useful and Ingenious.

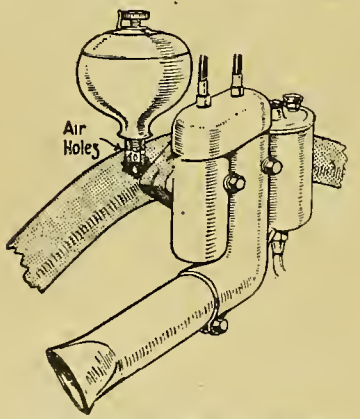
DOUGLAS TIPS.

THESE apply to a 1912 single-speed machine in the first instance, but can, of course, be applied to almost any model. Though simple, they are very effective.

(1.) To obtain easy starting the main air inlet was closed down by making the section of the pipe oval instead of round.

(2.) When heavy fuel mixtures became necessary this failed, so a rubber stopper the right size for the air pipe was obtained. It was tied by a piece of cord to the frame. When starting the stopper is pushed into the end of the pipe, and pulled out when the machine has got going. This never failed me on a half-and-half mixture.

(3.) Finally, for use with pure substitute, something better than this had to be devised. A tap was screwed into the induction pipe at the centre, and a few drops of petrol were injected here. This worked, but, of course, was not satisfactory. Therefore the water tank, needle valve, and jet of an old acetylene cycle lamp were screwed into a piece of brass tube, which, as shown in the sketch, was screwed into the induction pipe. Two air holes were made, about $\frac{1}{8}$in. diameter or less.

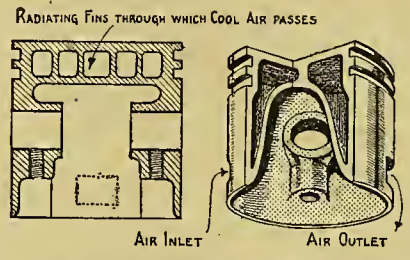


A Douglas rider's device for effecting an easy start when using heavy fuel.

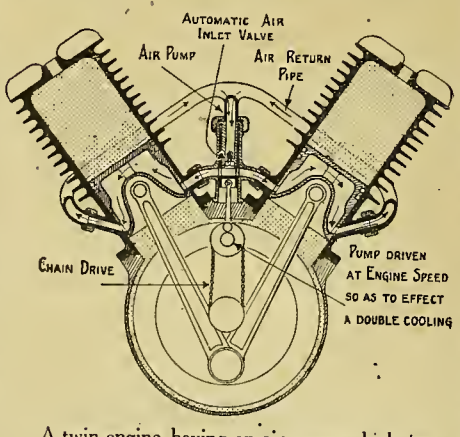
Fill this tank with petrol, benzole, benzolene, alcohol (absolute), or a mixture of 75% paraffin and 25% ether (methylated), or anything similar available. Open the needle valve about a quarter of a turn, turn on the substitute (do not flood the carburetter), close the throttle, and push off. When the engine has started (which takes place usually about the third turn over), the needle valve can be closed. If desired the handle of the needle valve can be "produced upwards" by means of a brass rod, terminating in a brass wheel on the top of the tank.—G. S. JONES, Sheffield.

AIR-COOLED PISTONS.

THE article on "Internal Cooling," which appeared in *The Motor Cycle* of April 19th, has prompted a reader to send us some interesting sketches of a method of cooling the pistons of a motor cycle engine. A pump is provided on some convenient part of the crank case—on a V twin it would naturally be between the cylinders—and driven at engine speed. This pump is timed to force air through spaces in the specially designed piston at the bottom of every stroke. As shown in the illustration, the air is returned to the pump by means of return pipes, and is cooled to some extent in its passage through these pipes. This arrangement has the advantage of excluding dust and retaining the oil in the crank case, but a greater cooling effect would be gained by drawing fresh air from the atmosphere at every stroke. The idea exists at present only on paper, but it is certainly ingenious and worthy of further consideration.—L. C. HOADLEY, Penge.



Sectional elevation of a suggested design of air-cooled piston.


Automatic Air Inlet Valve
Air Pump
Air Return Pipe
Chain Drive
Pump driven at Engine Speed so as to effect a double cooling

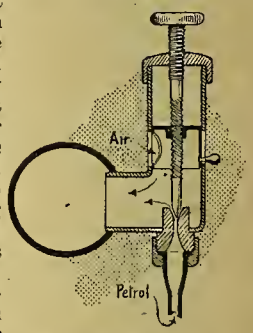
A twin engine having an air pump which has been designed by L. C. Hoadley to circulate cool air inside the piston.

POWER AND ECONOMY.

RIDERS of two-strokes will, I think, find the following tip useful, if they wish to increase the power of their engines, and at the same time improve the petrol consumption:

First, fit an elbow between the engine and the carburetter, so that the air inlet faces forward. Drill the elbow in two places (as sketch). In one hole fit an oil pipe; in the other a large bore compression tap. This can be opened as soon as the engine has started, and a marked increase in power will be noted. Also petrol consumption is improved 20 to 30 m.p.g.

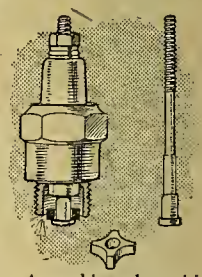
Next remove the gauze and holder from the carburetter air inlet. Get a piece of copper pipe about 3in. long which will fit over the air inlet, bend slightly or saw across at a slight angle, and solder together to make a bend. Solder a piece of tin to the end, forming a muff round the exhaust pipe. This will greatly improve running, especially with petrol substitute, for which hot air is necessary.—EXCELSIOR, King's Heath.



A starting device for use with heavy fuel.

A SELF-CLEANING PLUG.

SPARKING plugs usually have electrodes which are fixed in their relative positions, and when sooting or oiling up occurs the plugs have to be removed for cleaning purposes. It is, however, desirable that any deposit should be shaken or knocked off as soon as it is formed, and for this reason plugs have been made with revolving or sliding electrodes. The plug we illustrate, which is the patented invention (No. 104,770) of Mr. J. J. Creasey, Coventry, combines these two movements, and the electrode consists of a loose disc or star-shaped piece carried on the central conductor. This loose piece will be continually on the move while the engine is running, and therefore should clear itself automatically of any carbon or other deposit.



A sparking plug with revolving electrode, by means of which the carbon is automatically removed from the plug points.

OCCASIONAL COMMENTS

BY IXION

Replacing Self-cottering Valve Springs.

NOBODY has yet obliged me with a simple workshop tip for refitting that type of valve spring which cotters itself with its own tail. I devoted much adipose tissue, of a non-superfluous kind too, to the task, and was finally fain to revert to the ancient and oft-derided tip of squeezing the springs up in the vice, tying them with twine, and then waggling them with the pliers till at last their tails, which struck me as absurdly long, snicked into the cottering slot.

American D.R.'s.

IF the war lasts long enough, I suppose we shall be seeing some American D.R.'s in France, and it will be interesting to see if their 7 h.p. spring frames with 3in. tyres relish knee-deep mud and shell-holes better than our smaller mounts. The riders ought to be good enough for anything. My latest American exchanges contain pictures and stories of what is evidently "some" hill-climb. Tired of racing up gradients which everybody can climb, the riders have unearthed a mighty sandhill, with an alleged grade averaging 50% (1 in 2) and stiffening towards the top to 70%. All the boys fitted some sort of caterpillar track to their back wheels, and none of them reached the summit. Your performance is recorded by the number of feet above sea level you attain before your front wheel tips over backwards by gravity and hits you on the nose, unless you are deft enough to unsaddle when you see it lifting. Firemen armed with jumping-sheets are stationed at intervals along the course, and salve you as you fall backwards off the hill, etc., etc.

Road Vibration with Lightweights.

WE are already feeling our way towards a new era in motor cycling, in so far that the lightweight of to-morrow promises all the speed and climbing power which seven riders out of ten demand. The remaining 30% of us will probably continue to expect a higher maximum speed and faster climbing than lightweights can provide for many a year to come; or, to be more precise, the rider who has a lot of use for a 40 m.p.h. gait prefers it on a fairly high gear and modest throttle opening, and dislikes it on a low gear and liberal throttle. If the above statement is true, road vibration on lightweights is the next snag which the evolution of lightweights must encounter. In all my experience I have only owned one machine of less than 500 c.c. on which I would voluntarily tackle a 200-mile run, supposing that a bigger mount was available; and this solitary exception to my rule scaled about 230 lb., although it had a 350 c.c. engine. Fast work on a light machine is usually miserable for the rider, and almost always deleterious to the machine. Spring frames are being patented by the dozen, and I suppose there is to be a boom in them when the war is over; but they are all of them designed regardless of weight, or at any rate without regard to the evolution of the lightweight. We already possess reliable lightweights, fast lightweights, and hill-climbing lightweights; but we have never had a genuinely *comfortable* lightweight. One of the cruxes of the lightweight market is that its clients are mostly people who dislike vibration. If we are not farsighted, our engine design will run ahead of our frame design; this has been the rule ever since motor cycles came along, and the failure has not done much harm, because motor cycles appealed to tough people until recent days. To-day we are on the verge of producing motor cycles which will appeal to weaklings and old men and women, and the most perilous snag in our road is road vibration. A featherweight spring frame will soon stand out in high relief as the industry's main requirement.

The Petrol Committee.

SOME very curious cases of renewed petrol permits are coming to light. Readers who have been refused a permit in reply to agonised letters setting out their claims and the indispensability of their work, have hit the bull at a second discharge. After refusal, they send a purely formal letter, enclosing a cheque for the next six months' duty on such and such a number of gallons at so many gallons per month, and receive their renewal card within a post or two!

Why do Valves Pit?

I SUPPOSE the experts have some exact theory as to valve pitting, and I dare say ignorant riders, like myself, would be interested to hear the respective parts played by heat, solid residues from the oil, and fragments of silica inhaled with the mixture, in marring our valve fits. I am moved to ask the question because I recently overhauled an o.h.v.f.t. (reads like an Army indent, doesn't it?), and found that, though both cylinders were evenly carbonised, the (presumably) cooler exhaust valve of the front cylinder was practically perfect after a prolonged mileage of very heavy work, whilst the shielded valve in the rearward-facing head of the back cylinder required quite a lot of grinding. To my simple brain this would imply that heat plays a large part in valve pitting, and that the pits are really heat spots, due to the chemical action of high temperature on the metallic constituents of the valve, rather than wounds due to the hammering impact of valve and seat with some flinty fragments interposed. Will one of the size 8 hats again oblige with a solution?

HINTS TO NOVICES.

Jottings from a Competition Rider's Notebook, embodying much Useful Information for Recruits in the Technical Sections of the Army or Navy.

ONE of the chief things for a novice to bear in mind when first taking possession of a new mount is not to interfere with anything so long as the machine is running all right. The most satisfactory way of obtaining the best results from a motor cycle is simply to keep it correctly adjusted and oiled, not try all sorts of experiments, such as altering valve and magneto timing and cutting the carburetter about in the hope that by some curious accident an improvement can be obtained. In most cases the reverse is the result, and possibly the instrument is ruined, so that a new fitting is the only cure.

THE ENGINE.

Don't tinker.

Don't run a new engine "all out" until after 250 miles.

Oil liberally.

Do not start off straight away on a long journey, letting the machine all out and keeping it going till you find your engine is red hot, and a seized piston or bearing results.

Running In.

When the newly bought machine arrives, whether it is a new or second-hand one, go for a short run at moderate speed, taking mental notes of anything that does not seem quite correct or comfortable, such as position of saddle, handle-bars, and levers, a distance of five miles being quite sufficient to find out these small matters. After returning they can be altered with any other things found not quite satisfactory, with a certain knowledge of what is really needed to be done.

Should the machine be an absolutely new one, never, upon any account, run the engine all out until it has covered at least two or three hundred miles, by which time all the various parts that go to make up the machine will have settled down and be running quite smoothly, and there will be little likelihood of trouble caused either by seizure or distortion. After a trial trip it is always as well to go over every single nut and screw in the machine and make sure that every one is tight. This precaution will save any amount of worry and trouble on the road later.

It is well, too, not to trust to the amount of oil that has been put into the various bearings such as wheels, gear boxes, etc. It is always safer to have too much oil at first than too little. In order to force the lubricant into the wheel bearings a screw-down grease gun is a most useful accessory. *In the case of hubs* it will be found best to fill them with a light grease, after which a little engine oil injected from time to time will ensure the grease being kept fairly thin and reaching the bearings. For gear boxes heavy oil is usually most satisfactory, although a mixture of light grease and engine oil is also good.

Lubrication, though so important, is one of the points that is usually most neglected, especially where the cycle parts are concerned. It will generally be found that ordinary engine oil will be quite suitable for all parts provided it is not too heavy an oil. Fortunately, very few people forget to lubricate the engine owing to the fact that there is usually some definite means of effecting this operation, and it is very little trouble to perform.

The gear box is the next most important item, after which come the road wheels. These should be attended to, as before mentioned, at least every five hundred miles—that is, oil injected. The hubs might be cleaned out and a fresh supply of grease inserted about every 5,000 miles. Although at first sight it would seem there are but few parts which require oil, it will be found upon examination that there are many moving parts which would be better for a few drops of oil from time to time, and this in the long run will prove a big factor in prolonging the life of the machine. There are other little parts, such as the joints of the operating mechanism of clutch, gears, and brakes, and in some machines, such as the Indian, the carburetter controls can often do with a little oil, but this is frequently neglected, with the result that in the long run these parts very gradually show slight signs of wear, which, once started, rapidly increases with vibration, and ultimately quite deranges the adjustment of the units mentioned. Several cases of trouble have come to light lately where inferior fuel has been constantly used. The trouble is caused chiefly where the sump type of lubrication has been used and the oil has to be circulated and used over and over again. It would appear also that benzole in some way affects the oil, causing it to form a thick black treacly substance so that proper lubrication is hindered, and frequently a badly worn cylinder is the result.

LUBRICATION.

Don't neglect the cycle parts.

Don't trust to the original amount of oil in gear box and hubs.

Care of the Magneto.

This is one of the most reliable parts of the modern motor cycle, and is usually best left alone, unless perhaps the following adjustments might be looked

Hints to Novices.—

to now and again, otherwise it will hardly ever require attention, or, if it does, it is a job for the electrician. The contact-breaker should be kept clean and the rocker arm quite free; the points should separate the distance of .4 mm., roughly the thickness of a visiting card. The carbon brush and slip ring should be looked to just occasionally, and should be kept quite free from oil. A curious trouble due to the above fault came to the writer's notice recently. A twin-cylinder machine fitted with one of the latest type of American magnetos was troubled by the engine refusing to run on both cylinders. It would run evenly on either one or the other, but not both, and if the usual dodge of testing the plugs by shorting with a screwdriver to ascertain which cylinder was the culprit was tried, the engine would immediately stop firing altogether, no matter which plug was shorted. This trouble was eventually traced to an oily slip ring, which allowed the current to short from one carbon brush to the other, thus allowing only one cylinder to fire. Also, if one plug were shorted, it shorted the current from the other brush as well.

CARE OF MAGNETO.

To leave well alone is a good maxim.

A sticking rocker often gives trouble, and damp is the cause.

Keep platina clean and flat.

The magneto requires but very little oil, a few drops, say, every 1,000 miles will be found quite sufficient. A sticking rocker arm is often a source of trouble, causing either total absence of spark or frequent misfiring. This trouble is generally noticed after the machine has been put away for some time, and is caused by the fibre bush getting damp and swelling.

Carburetters.

A lot of small troubles can be avoided if the carburetter is taken down from time to time, whether it seems to require it or not, and the float chamber cleaned out. It will nearly always be found to contain quite a lot of dirt—usually little fragments of paint off petrol tins, and filings which come from goodness knows where, possibly parts of the float and toggle arms that are slowly wearing out.

CARBURETTER.

A large jet causes overheating and extravagance in fuel.

Too small a jet, difficult starting and lack of power.

Avoid air leaks.

The carburetter is a part that is just as well left alone, as far as adjustments are concerned, unless there is obviously something wrong. It is sometimes thought that by putting in a huge jet the power will be increased, but this is not so. The greatest power is obtained on one particular jet setting which can only be found by experiment. If the average modern, semi-automatic carburetter is correctly adjusted the action will usually be found to be as follows. For starting, the air lever should be closed, and throttle only about one-quarter open. Upon the engine firing, one should be able to open the air fully. When full throttle is given, however, it should be found that an advantage is obtained if the air is slightly closed. Too large a jet causes overheating and high petrol consumption, a black smoke frequently being emitted from the exhaust. Too small a jet causes difficult starting, lack of power, and popping through carburetter upon throttle being opened. Most carburetters require flooding slightly before starting, especially from cold. Notable exceptions are the Senspray and B. and B. Universal. These should not be flooded. Another exception to the above rules is in the case of the Baby Triumph, where, instead of closing the air lever for starting, it should be opened about one-half to threequarters.

Slow Running.

Slow running is the point which usually troubles the beginner as much as anything. He usually finds his machine will be quite fast enough for him, even if it is somewhat out of tune. The thing is it will not run slowly or start easily. This trouble may not be found at first, but may develop after a few hundred miles have been covered. Difficulty in slow running is usually caused by carburation trouble, and this takes the form of an excess of air. Sometimes there are air leaks between the carburetter and the engine; these can generally be cured by means of insulating tape. Occasionally there is so much clearance between the valve stem and guide that the carburation is upset by the air which enters at this point. Then again a carburetter may be so designed that it is impossible to cut off sufficient air for satisfactory slow running. Excess of air may be tested for in a very simple manner. Throttle down the engine until the running becomes irregular and misfiring occurs; then cover the main air intake partially or wholly with the hand or a cloth; if this improves the running it is obvious that too much air was previously entering the engine, and steps must be taken to correct this by eliminating all air leaks. If this is not sufficient, a cover for the air orifice must be extemporised and used when required.

TO OBTAIN SLOW RUNNING.

Look to the exhaust valve spring.

Set the plug points at .5 mm. or more.

(Too small a gap will give trouble.)

A rare cause of a machine refusing to run slowly with the engine running regularly is that the exhaust valve spring has lost its strength. The symptoms are: Machine will usually start easily on about half throttle and go quite well at moderate speed, but at very low speed, when the throttle and air are practically closed and the engine should be just ticking over, it misses fire and often after a few desultory explosions ceases altogether.

It is quite a simple matter to ascertain whether it is the valve springs. Start the engine either on the stand or in neutral position, and before closing the throttle and air right down place a screwdriver on the spring cap and put a certain amount of pressure on it. If it is the spring that is at fault it will be found that this pressure on the end of the spring will correct the firing, in which case a new spring slightly stronger than the old one should be fitted. The reason the weak spring affects the running at slow speeds and not at greater is that, when the inlet valve is open and the engine is sucking hard on the

Hints to Novices.—

carburetter, the fact of the throttle being practically shut prevents the engine drawing in the gas easily; therefore, if the exhaust spring is not quite strong enough, it allows the exhaust valve to draw open as well by the suction, thus admitting air and spoiling the mixture and causing missing, etc. A trouble, the symptoms of which are very similar and might easily be thought to be caused by the same thing, is the plug points being incorrectly set.

Plug Points.

Plug point setting has a wonderful effect on the running of an engine—a great deal more than people usually think. The gap which usually gives the most trouble is the one which is too small It is often considered that the setting required for easy starting and slow running is with the points quite close together. This is sometimes the case, but it will usually be found that, after the engine has run for a few explosions, it will commence an intermittent misfire and refuse to run slowly. This is caused either by the spark being too small to ignite the gas properly, or the heat of the explosion causing the electrodes to expand until they become so close that they almost touch. The most satisfactory, both for easy starting and slow running, is a gap from $\frac{1}{32}$in. to $\frac{1}{16}$in. It is sometimes supposed that a multi-point plug is less likely to soot up than a single-point one, but this is quite a mistaken idea. If anything, the multi-point is the easier to soot up, for the following reason. The spark always takes the path of least resistance, so that as soon as one of the points starts to become oily or sooty, the spark jumps to the one that has the least oil or soot on it. The point where the spark is taking place is always least likely to become oily. When there is no spark taking place the oil collects without hindrance and very shortly bridges the gap right across. As soon as this occurs a short circuit is formed, so that the spark ceases to take place at all. For this reason a good single-point plug with stout electrodes will usually be found the most satisfactory, especially in the case of "two-strokes," where sooting and oiling up is a frequent trouble.

Accessories.

The beginner usually starts off by fitting every conceivable accessory and spare that it is possible to crowd on to the machine. Or going to the opposite extreme he will start away on a long run without any spares at all, even a hooter being dispensed with occasionally. Of the two evils, the latter is really almost to be preferred. Overcrowding a machine with fittings nearly always ends in any amount of bother on the road, the different parts often shake loose or drop off, and possibly cause damage to some other part of the machine.

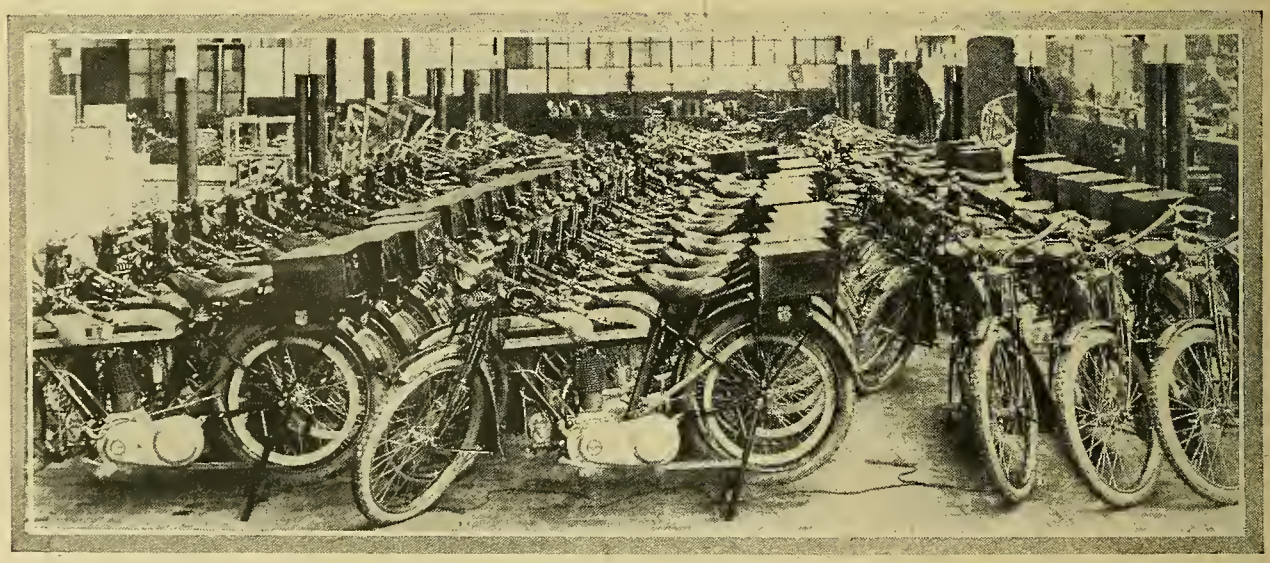
For absolute reliability the fewer things there are on a machine the less there is to go wrong or get out of order, and the less to look after. The only fittings that are really necessary and should not be overlooked are lamp, generator, and hooter. A speedometer, though not a necessity, is a most useful fitting, especially where the mileage is recorded.

SPARES AND ACCESSORIES.

Don't overcrowd your handle-bars.
Don't commence a long journey with too few spares.
Make sure your spares fit.

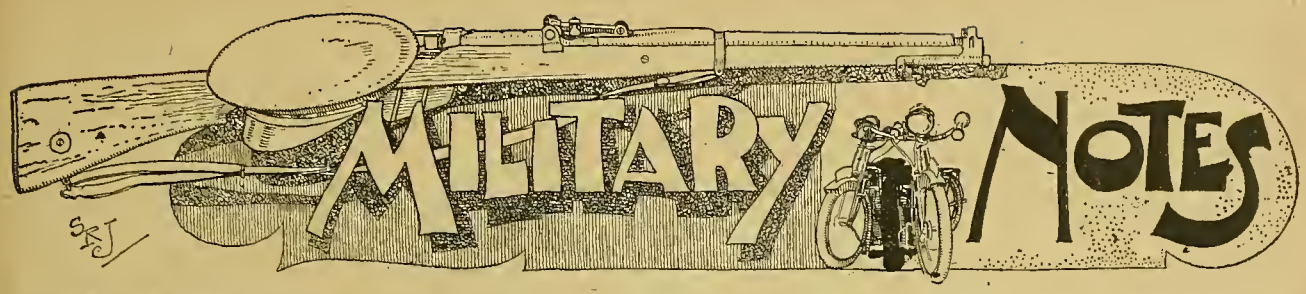
Then, with regard to spares and tools—one large spanner, one screwdriver, three tyre levers, belt or chain punch—or, where both types of drive are used, one of each, a pair of pliers, and a set of special spanners for such parts as valve caps, magneto, head lock-nuts, etc. It is always best to use a fixed spanner that fits the nuts rather than an adjustable one.

The spares should comprise a valve complete, or, if the valves are different, it is as well to have a spare for each, although it is a very rare occurrence for an inlet valve to break. Also an assortment of nuts, bolts, washers, pins, and a tyre repair outfit.



WAR MODEL MOTOR CYCLES.

Part of a batch of 150 W.D. Triumphs ready for despatching to the various zones of war. The whole of the production of motor cycles by several of our leading manufacturers is absorbed by the Allied Armies.



AIRMAN-MOTOR CYCLIST'S HONOUR.

DURING 1915 a number of letters appeared in these columns from two despatch riders of the name of Rice. They were brothers, sons of Dr. Edward Rice of Allesley, near Coventry, and enlisted originally as lorry drivers on August 5th, 1914. One sustained a broken leg owing to colliding with an unlighted car. Last year they were transferred to the Royal Flying Corps, and both now hold the rank of Captain. We observe with interest that Capt. B. C. Rice was last week awarded the Military Cross. The brothers Rice are well known to Coventry motor cyclists, as they were pupils at the Daimler works, and regularly travelled backwards and forwards together on a Morgan Runabout.

TANK TALK.

A GERMAN paper attempts to describe the new Tanks brought into use by the British this spring. It gives their measurements as 26ft. long, 6ft. high, and 10ft. wide. The paper in question talks of "male" and "female" Tanks, the "male" having two light guns in turrets at the sides, with two machine guns above them, whilst the "female" has five machine guns—two at each side and one in front. The crew, it is added, consists of one officer, a driver, and six men. The "Tank" is propelled by a Daimler motor of about 100 h.p., and the plating of the cars is of $\frac{8}{10}$in. steel. Two to three and a half miles an hour is given as the speed of the cars.

An American journal just to hand is far more ambitions, stating authoritatively that the latest "Tanks" are lighter than their predecessors, have two six-cylinder petrol engines of over 500 h.p., and travel at the remarkable speed of eighteen miles an hour.

SUFFICIENT DESPATCH RIDERS OBTAINED.

IN connection with the appeals published in *The Motor Cycle* for despatch rider recruits for the R.E.'s Signal Service, we are advised by the Commandant of the Training Centre that a sufficient number of applications have now been received to meet present requirements. The names of those selected have been forwarded to the Director of Recruiting, who will issue (or has already issued) the necessary instructions to local recruiting officers for the calling up of the men selected. He proceeds: "Apparently it is not clear to the various applicants that nothing whatever can be done by me towards the actual calling up and posting to this branch of the service. This is entirely in the hands of the Director of Recruiting at the War Office. Urgent letters and prepaid wires are constantly received asking for an immediate acceptance or non-acceptance. This I am quite unable to give, though all such communications are answered as speedily as such an abnormal increase in correspondence can be dealt with. Those who do not receive a calling-up notice within a reasonable time may assume that we are full up for the moment."

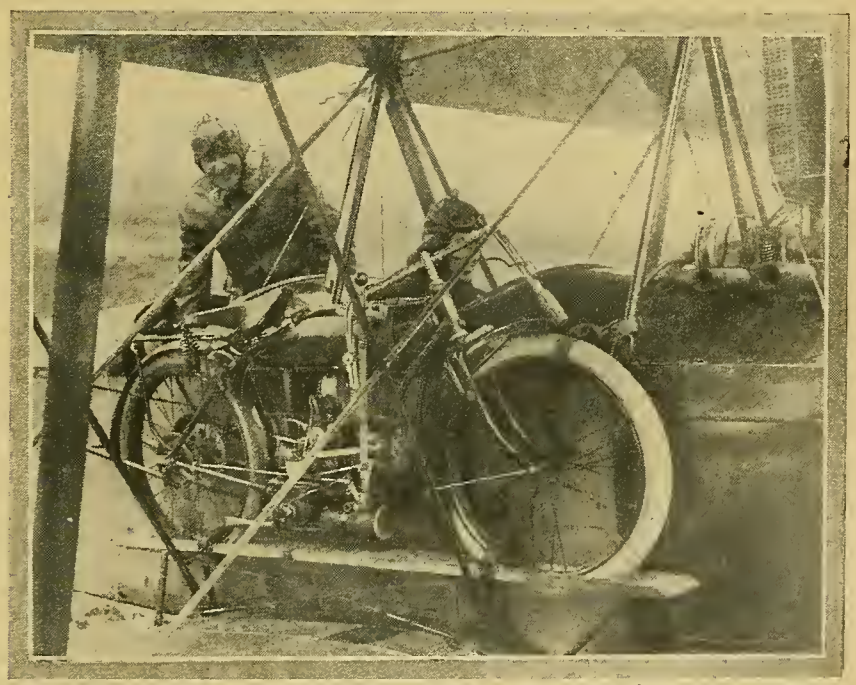
The Commandant concludes with profuse thanks to the Editor for his assistance in obtaining the motor cyclists required for the R.E. Signal Service.

A MOTORING FAMILY.

OCCASIONAL references to the doings of the brothers Bentley have appeared in our pages for many years past. The best known of the three, Arthur W. Bentley, whose sad death we announced just over three years ago, broke the Land's End to John-o'-Groat's record in 1908 on a Triumph, and subsequently set up a record on a Rex sidecar.

W. O. Bentley, now a lieutenant in the R.N.V.R., once the rider of an Indian in the T.T., late the able exponent of D.F.P. cars, both at Brooklands and in the Isle of Man, is at present the owner of a flat twin Humber and the designer of a very excellent aviation engine used by the Admiralty; while the third brother—H. M. Bentley—to whom we have had occasion to make reference in the past, is now in the R.F.C. It is related that he, when a sergeant in the H.A.C., was convicted for having exceeded the speed limit on a motor bicycle and sidecar. Now he appears in Saturday's *Gazette* as having been promoted from First-class Equipment Officer R.F.C to the rank of Temporary Captain and the post of Assistant Director of Military Aeronautics. This is indeed a fine family record.

In the same *Gazette* it was announced that Temp.-Capt. Charles Jarrott had been given the post of Park-Commander and the rank of Temporary Major in the R.F.C.



The aeroplane and motor cycle are proved absolutely indispensable in the present war, but up to the present they have not been used in conjunction in the intimate manner illustrated by the photograph. One advantage of this arrangement would be in case the aeroplane met with mechanical trouble and was forced to descend. The airman or his assistant could then quickly detach the motor cycle (in this case an Indian flat twin) from its platform, mount it, and ride away for necessary supplies and assistance.

SIDECAR MANUFACTURE IN THE WAR ZONE.

THE improvised sidecar illustrated is termed an "Active Service Sidecar" by the constructor, Artificer Cpl. C. H. Fisher, of the Australian Forces in France. It was built with T iron which he scrunged out of old ruins. Not being able to get any decent wood, he says, a box had to serve the purpose of a body. The sidecar has travelled a good many hundreds of miles, and is standing up to the work well.

The despatch riders of the Australian Forces are mounted on Triumph three-speed models, and, taking into consideration the fact that the roads are in an awful state, and that the winter has been one of the worst for ice and snow that the French have had, "the old trusty Triumphs are standing up to the work remarkably well" is the final comment.

FROM B.R.C. TO R.E.

WE recently had a call from Driver H. E. A. Chinn, of the Section Sanitaire Anglaise, a branch of the British Red Cross Society which is serving with the French Army in the Verdun sector. His particular section work nearest to the front line, and nearer to the fighting, so he told us, than the British Ambulance Committee, to which we have previously referred in these pages. Driver Chinn, who is seen standing by his ambulance, has come back to England with the idea of joining the Signal Section, R.E., and becoming a despatch rider.

A former member of *The Motor Cycle* staff is at work in this sector with an ambulance convoy. He had previously been rejected for military service.

Dvr. H A. Chinn, of the Section Sanitaire Anglaise, attached to the French Army in the Verdun Sector.

MOTOR CYCLES IN THE WILDS OF AFRICA.

"THE burning topic of flat twin, V twin, or single has even penetrated into the wilds of Africa,

AN AUSTRALIAN ACTIVE SERVICE SIDECAR BUILT IN THE WAR ZONE.
Left to right: Cpl. F. Lightwood, D.R.; Cpl. A. Hollins, D.R.; Art. Cpl. Fisher; Motor Driver F. Thompson.

and actual experience of machines used in German East—a particularly difficult country—may be of particular interest," so writes "Q.E.O.," attached to one of the Light Armoured Motor Batteries of the Motor Machine Gun Service. "The two types used out here on war service," he says, "are flat 2¾ h.p. twin Douglases, and a couple of high-class makes of 4¼ h.p. singles, both belt and chain transmission with three-speed countershaft gear boxes. Let it be said straightaway that both types of machines—singles and twins—are standing up extremely well under exceptionally hazardous conditions, and reflect great credit on their makers and the British motor cycle industry in general.

"We have still our original number of machines; they have never been under cover, stand in the open or under a tree in the sun and tropical rainstorms alike, and, except for water in the carburetter, have never failed to start in under ten yards. No valves broken, big ends untouched, original piston rings and plugs. Only once has it been necessary to take off a timing case cover. Forks have given a little trouble, because of the absence of sensible oilers or grease caps. Frames have stood up well, but the supply of spare spokes runs into large numbers.

"The dust in the dry season covers all the lower half of the machine with a whitish-red coat, and is sucked in through the carburetter. Yet on putting the callipers on a cylinder, there is no trace of its wearing oval, although the deposit is half carbon and half earth. Engines and gear boxes are reliable, but the machines have suffered with chain and belt trouble right through."

A MOTORIST'S WAR WORK.

WE learn that Captain C. L. Scott, A.S.C., has been compelled to resign his commission owing to ill-health. We first met C. L. Scott in 1912 at the Circuit de la Sarthe, run from Le Mans. He was then riding a Rudge motor bicycle, and was serving his time as a pupil with Messrs. Hotchkiss, of Paris, in their car department. Throughout that year and the year following he took part in numerous French trials on his Rudge motor bicycle, the last important competition in which he rode being the successful Paris-Nice Trial in 1913, which *The Motor Cycle* organised a party to follow. In 1914 he came over to England and joined the firm of S. C. Westall, and took part in various British competitions on a 3½ h.p. Motosacoche and an A.C. light car.

Captain Scott was gazetted Second-Lieutenant A.S.C. in August, 1914, and saw considerable service in France. He then returned home on sick leave, served in France again, and had several other spells of sick leave. Finally being restored to health, he went to Salonica, where his health suffered considerably, with the result that he has been compelled to return to a civilian career.

A BELGIAN MOTOR CYCLIST'S NEW ROLE.

A FAMOUS ex-racing and pacing Belgian motor cyclist is Jan Olieslagers, whose name will be remembered by many old-time motor cyclists. In the illustration he is seen in the fuselage of a Nieuport aeroplane, which he handles with success. In Paris he was known as *Le Demon Anversois*.

Jan Olieslagers, the ex-racing Belgian motor cyclist, as airman.

Further Testimony from Motor Cyclists in German East Africa.

The experience of the South African Motor Cyclist Corps mounted on 400 B.S.A. Motor Bicycles is further described by Capt. F. J. Ashley, Chaplain of the Force. Writing of the rough usage which the B.S.A. machines had to undergo, he says:—

"Fair play and justice demand that you should be acquainted of the wonderful performances of your machines and the credit they have earned for you. It has often been amusing to hear the men dilate upon the achievements of their individual machines, and pit them one against the other, because when we started, the opinions as to what they would do were very diverse, only a few having ridden B.S.A's. But it only needed time and experience to change aversion or indifference into first respect and then enthusiasm, and if there be those who from various reasons will return to former mounts there is not one but has the greatest faith in the B.S.A. for being foolproof, unbreakable and reliable."

B.S.A.
MOTOR BICYCLES

For Solo and Sidecar.

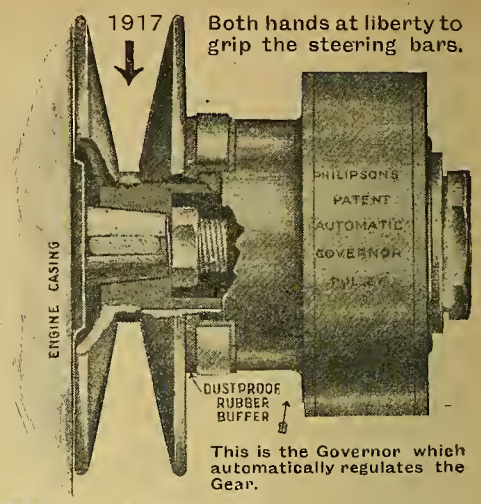
Catalogue Free.

THE BIRMINGHAM SMALL ARMS COMPANY LIMITED,
47, Small Heath, Birmingham.

PHILIPSON'S PATENT AUTOMATIC GOVERNOR PULLEY

AS SUPPLIED TO HIS MAJESTY'S FORCES
(MOTOR CYCLE SECTION).

TWO WORKING PARTS ONLY, NOTHING TO GO WRONG. Takes the place of the ordinary pulley. Absolutely no end thrust to engine bearings. Most machines can be fitted, without alteration, in a few minutes.


1917
Both hands at liberty to grip the steering bars.
ENGINE CASING
PHILIPSONS PATENT AUTOMATIC GOVERNOR PULLEY
DUSTPROOF RUBBER BUFFER

This is the Governor which automatically regulates the Gear.

A GEAR WITH A WORLD-WIDE REPUTATION.

PATENTED AND REGISTERED
PA PH GO PY
TRADE MARK
HOME AND ABROAD.

NONE GENUINE UNLESS IT BEARS THIS TRADE MARK

PRICE:
£4 - 10 - 0

Can be obtained from leading Shippers, Factors, and Agents all over the world.

T.T. Douglas machines are wonderfully improved by fitting the gear, Clutch models excepted.

Unbiassed Opinion

(*Copy.*) Pendleton, Kilners Park, Ulverston.

Messrs. Philipson & Co.

Dear Sirs—Could you send me one of your booklets on the Pulley. I have one fitted to my 1916 T.T. Rover, and must say that it works very well. It will take very stiff gradients in the Lake District, which have many awkward hairpin bends, with a passenger on the carrier, with perfect ease. It is, in my opinion, the best variable gear yet invented, and also the most simple.

Yours faithfully,
(Signed) B. PEARSON.

(*Copy.*) Pendleton, Kilners Park, Ulverston,
25th Feb., 1917.

Messrs. Philipson & Co.

Dear Sirs—In reply to your letter I shall be very pleased for you to put my letter in advertisement. I cannot say too much in praise of your Governor Pulley. I have driven other solo machines with complicated gear boxes, but they are not a patch on your extremely simple gear. The Rover Co. having fitted all their single T.T. models with your Pulley, is, I think, a great testimonial.

Yours faithfully,
(Signed) B. PEARSON.

The Philipson Pulley has had a wonderful career, and has on many occasions been highly commented upon in the editorial pages of "The Motor Cycle" and other Journals.

Send for Booklet.

Sole Makers— PHILIPSON & CO., Engineers, Astley Bridge, BOLTON.

Telegrams—"Safety, Bolton." **Established over 30 years.** Telephone—147, Eagley.

Bowden Wire Ltd.

BEING wholly engaged upon production for the British and Allied Governments, we are unable to execute any orders for private purposes until further notice. We have in stock certain goods suitable for replacements. Customers are invited to state their requirements in this respect, and, if possible, these will be met.

Established 1897.

London

Victoria Rd. Willesden Junction. N.W.10

Godbolds.
B6

THE DUNHILL M.C. JACKET & OVERALLS

AS SUPPLIED TO H.M. GOVERNMENT.

Planned on the saddle, so to speak, the garments combining smartness with perfect ease and freedom.

Built of Paramatta Twill of the finest Proofing, and quite impenetrable to wind and rain.

The quality is unequalled anywhere for the price.

GUARANTEED ABSOLUTELY WATERPROOF.

PRICES:

Jacket with belt £2-2-0
Seatless Trouser Overalls £1-4-0

Dunhills

Ltd.,

359-361, Euston Rd., London, N.W.

2, Conduit St., W.

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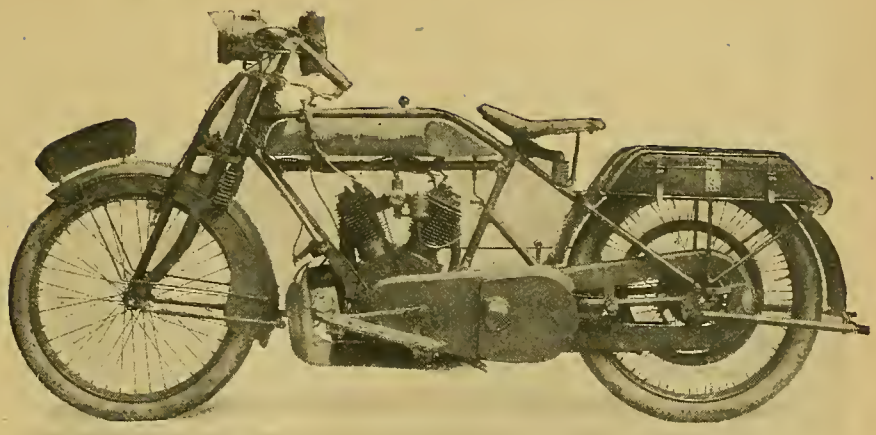
90-92, Crosa Street.

Glasgow:
72, St. Vincent Street.

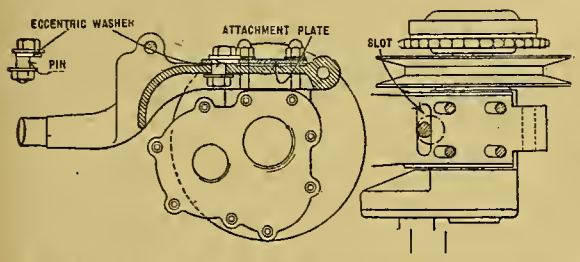
THE ROYAL RUBY RUSSIAN MODEL.

Several New Departures from Standard Practice. 8 h.p. V type Engine, Three-speed Countershaft Gear, Chain Transmission (partially enclosed).



Transmission side of the chain-driven three-speed Royal Ruby for the Russian Army.

AS will be seen from our illustrations, the new Russian military model Royal Ruby has many attractive features, and is the result of much thought devoted to the production of a machine specially suited to the strenuous requirements of military usage. Not only does the machine present a neat and businesslike exterior, but the frame has been reinforced and strengthened in a way which, it is anticipated, will eliminate all likelihood of breakage by fatigue of the metal.



Patented method of sliding the gear box to adjust transmission.

The model is fitted with an 8 h.p. (85½ × 85 mm.) J.A.P. engine, three-speed countershaft gear box of a well-tried type, the clutch being operated by a vertical arm, wire controlled; 28in. × 3in. tyres are fitted, Druid Mark II. forks, Dixie magneto, and Amac carburetter.

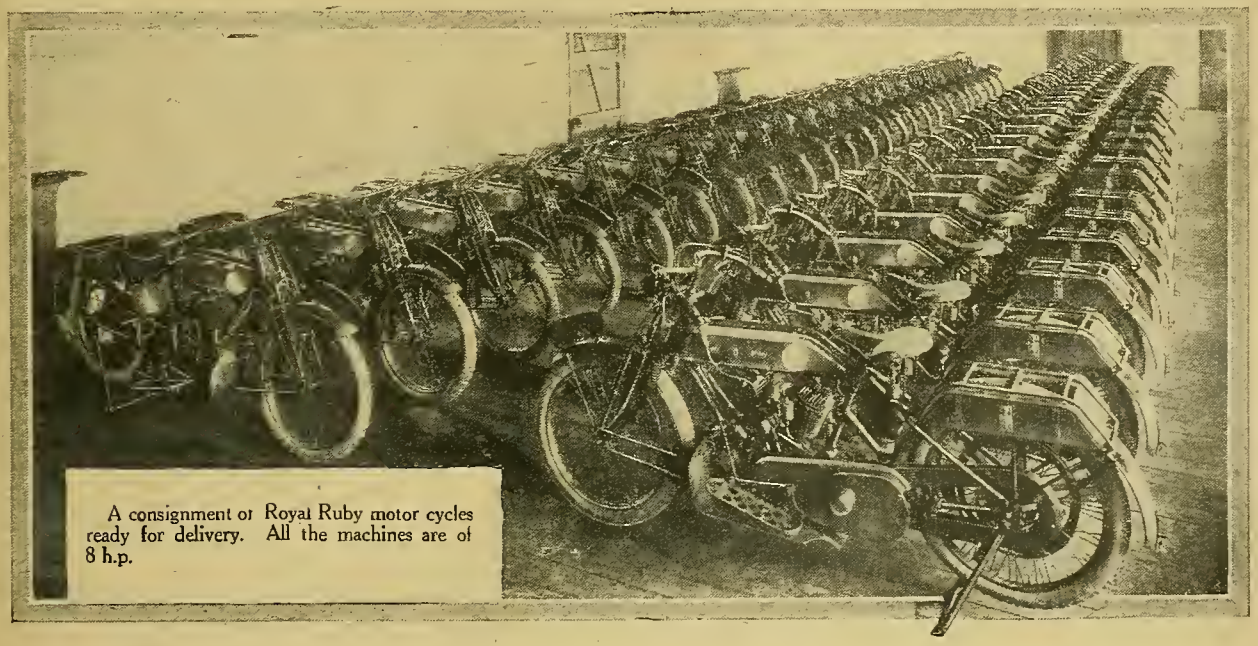
Specially Strengthened Frame.

The frame construction of this machine presents perhaps the most novel and interesting points. The front down tube, between the steering head and the engine, is relieved of bending stresses by the employment of two auxiliary steel struts, extending respectively from points of attachment on the steering head junction lug to the engine plates, thus forming a rigid triangular structure. The rear part of the frame is similarly reinforced by the employment of a short tube length, extending between the back of the gear box bracket and the centre of the seat tube. This system of construction relieves the rear forks of much of their work; indeed the frame is quite rigid and rideable with the rear forks entirely removed.

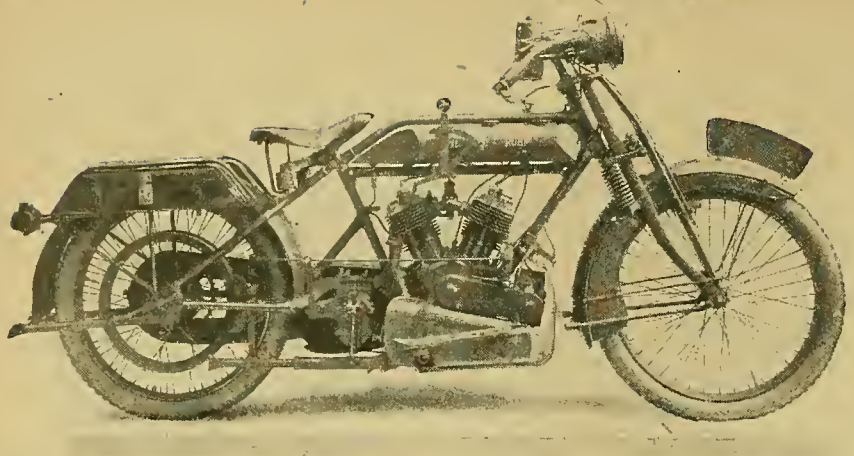
Special note should be made of the design of the carrier, which is a particularly neat piece of work, and presents no sharp corners, while giving ample strength. It further permits the use of exceptionally large tool-bags, this being an excellent point, and carries an 18in. pump clipped to its central cross member.

Ingenious System of Chain Adjustment.

The provision made for chain adjustment is also neat. The gear box is suspended from its bracket by the ordinary four-bolt system, but as every practical rider knows, gear boxes attached in this way are not always easy to move with that nicety necessary for



A consignment of Royal Ruby motor cycles ready for delivery. All the machines are of 8 h.p.



Valve side of the Russian Royal Ruby. The engine is 8 h.p., 85·5 × 85 (976 c.c.). The unique shape of the carrier bags, a supplementary down tube, and flexible exhaust pipes, are features peculiar to this model.

the exact adjustment of the chains. Very often, indeed, it is necessary to resort to the use of a hammer and block of wood, which is by no means good for the holding-down bolts anchored in the aluminium casting.

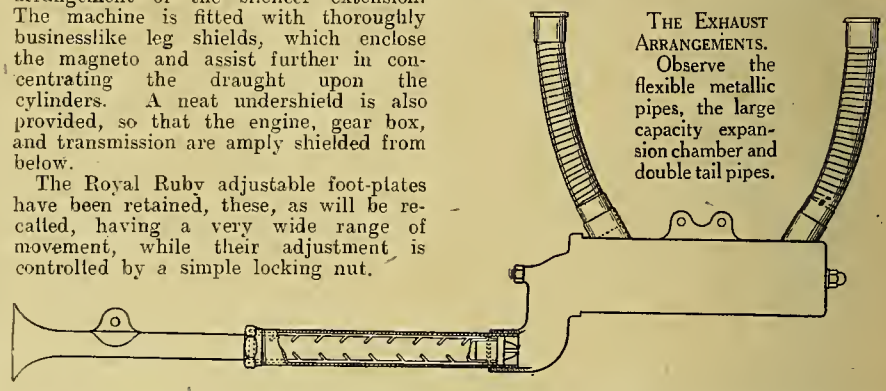
In the Royal Ruby system the movement of the gear box is effected in the very simple and neat manner shown on the preceding page. A loose plate lies between the nuts of the set-scerws suspending the box and the platform carrying it, this plate being provided with four holes, through which pass the gear box suspending bolts. Thus it will be seen that if the plate be moved in a horizontal direction it carries the gear box with it, and all that is now required is some simple and effective means of sliding the plate.

This is done as follows. At the back end of the plate is a large circular hole, through which passes an eccentric stud. Thus, by turning the eccentric stud the plate is moved in one direction or the other, the adjustment of chains, therefore, being very simply effected by the turning of a single nut placed in an accessible position.

The strength of the chain stay is another excellent point, the fork being of exceptional width, and integral with the gear box platform.

A ground clearance of 6½in. is given on this model, and apparently this could be increased by a slight revision in the arrangement of the silencer extension. The machine is fitted with thoroughly businesslike leg shields, which enclose the magneto and assist further in concentrating the draught upon the cylinders. A neat undershield is also provided, so that the engine, gear box, and transmission are amply shielded from below.

The Royal Ruby adjustable foot-plates have been retained, these, as will be recalled, having a very wide range of movement, while their adjustment is controlled by a simple locking nut.



THE EXHAUST ARRANGEMENTS. Observe the flexible metallic pipes, the large capacity expansion chamber and double tail pipes.

On this model very special attention has been paid to the silencing. The expansion chamber occupies an unobtrusive though reasonably accessible position alongside the crank case, and is provided with an internal baffle of special design. From it extends a tail piece in which still further provision is made for silencing the exhaust, as will be seen from a perusal of the illustrations. The whole of the silencing mechanism can easily be taken adrift for cleaning purposes; and we are informed that, while the arrangement is very effective, back pressure is practically non-existent.

Chain Transmission.

The rear stand is provided with a spring, which renders it automatic over the dead centre mark. That is, when the machine is pushed forward off the stand, the latter jumps up and automatically clicks into engagement with its clip at the tail of the rear mudguard.

All-chain drive is, of course, employed, the chains, though not totally enclosed, being provided with excellent shields, which can be very easily removed in sections, giving complete access to the transmission. This is a method which some prefer to the totally enclosed chain drive, and certainly the guards appear to be well made and substantially anchored.

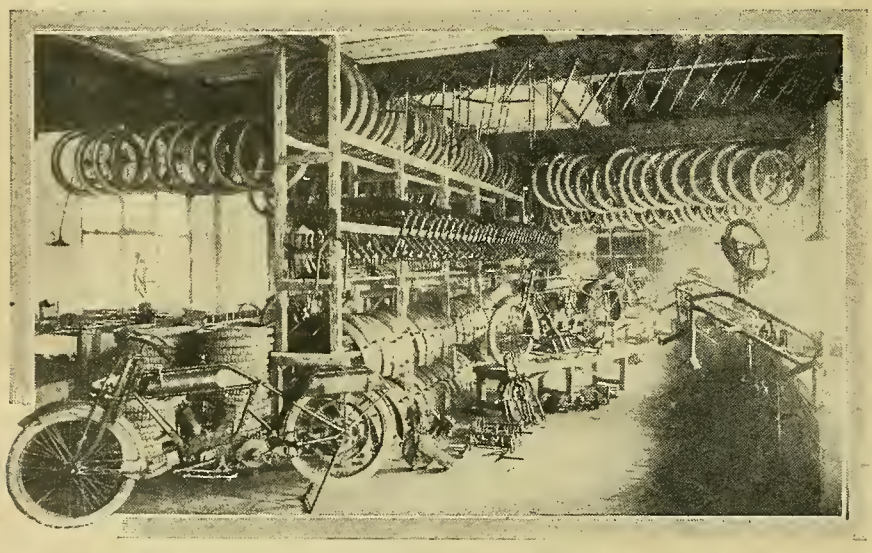
The rear mudguard carrier, pannier bags, and number-plate can be removed as one unit by the withdrawal of one long bolt and two set pins—a feature particularly commendable for a military machine.

The compensating foot brake operates on a special drum, and is a substantial piece of work having ample gripping surfaces, the block being so arranged that it falls parallel into the drum groove. Thus even wearing of the block is assured, while relining is a very simple matter, one of the side plates of the block being removable. The brake is mounted on a brazed bracket on the chain stays.

A front wheel stand is provided, and when not in action it is gripped to the front guard by a strong clip.

The general appearances of the machine are certainly very attractive. It conveys a general impression of sturdiness and workmanlike finish, and the handle-bars—an important point—are particularly well chosen. Brazed lugs are provided for sidecar connections—two-point lugs being incorporated in the steering head, so that four points of attachment are given.

The tank, which is of large capacity, is supported from below, and the machine throughout is a fine example of straightforward British workmanship.



Erecting shop in the works of the Royal Ruby factory showing machines in process of construction.

A NEW DESIGN FLAT TWIN.

A 3½ h.p. Side-by-side Valve Brough with Spring Frame.

IN next week's issue we shall describe and illustrate a new 3½ h.p. flat twin Brough with a spring frame. This machine is one of unusual interest, as in many respects it is quite a new departure from previous Brough practice.

The new model Brough is equipped with a very simple and efficient system of rear springing, which is highly promising, and our article will describe a practical road test of the machine, during which we were able to make mental comparisons between the old Brough and the new.

This new flat twin is designed chiefly for solo use, the object of the designer being to produce a comfortable and tractable machine, comfort to be considered before ultra-efficiency. Hence the abandonment of the overhead valve system for the side by side—the latter requiring less attention than the former and tending generally to minimise the amount of adjustment the power unit requires.

Mr. Brough's experience with flat twin engines is probably second only to that of Douglas Bros. and Mr. G. E. Bradshaw, and this machine is the outcome of long experiment and practical road test.

In addition to the new spring frame model, we shall describe an improved 5 h.p. side-by-side valve machine, designed primarily for solo use, which has been very considerably amended since our last description appeared some months ago.

MEN OF THE BRITISH ARMOURED CAR SECTION RESTING IN ARMENIA.

When the full account is written of the wonderful dash of the Armoured Car Section from Northern Russia to the Turkish and Rumanian frontiers, it will be found to be one of the most thrilling stories of the war. The photograph shows a small rest camp in Armenia and one of the motor cyclist scouts.

AGE FOR DRIVING LICENCES.

A.C.U. Action in the Blackburn Case.

WE exposed last week a decision of the Blackburn City Court to the effect that a sidecar was a motor car, and that accordingly a youth of fourteen was disqualified from holding a licence to drive it. Mr. T. W. Loughborough, the A.C.U. secretary, quickly got to work and sent a letter, of which the text is appended, to the Clerk of the County Justices:

May 1st, 1917.

Dear Sir,—My attention has been drawn to the report of a case heard at the Blackburn County Police Court on April 25th last when the Bench made the remarkable decision that a motor cycle with sidecar attached was not a motor cycle as referred to in the Motor Car Act 1903, Section 3 (5), and that the driver of a motor cycle and sidecar must therefore be of not less than seventeen years of age instead of over fourteen years of age, as is permitted for drivers of motor cycles.

By Art. XXI. of the L.G.B. Regulations, Motor Car (Registration and Licensing) Order, 1903, the expression "motor car" includes a motor cycle, except where the contrary intention appears. The term motor cycle is not defined in the Act, but the L.G.B. Regulations state that it is limited to motor cars designed to travel on not more than three wheels and weighing unladen not more than 3 cwt. This is clearly so as regards registration, see Act. VII. (7) of the above Order, and as regards the anuual carriage duty.

Accordingly, the Blackburn Bench have held that the driver of a vehicle legally registered as a motor cycle carrying the distinctive number plates of a motor cycle, and on which the carriage duty payable for a motor cycle has been paid, is not entitled to the right conferred by the Motor Car Act on the drivers of such vehicles, and is guilty of an offence under the said Act unless his age is such as to qualify him to drive a different class of vehicle.

I notice that, although the Bench have stated their intention to convict, they have postponed for a month the formal declaration of their decision. I trust that in the meantime they will, now that the regulations governing the matter have been brought to their notice, reconsider their decision; but if they are still of opinion that the driver of a certain class of motor cycle is not entitled to the privileges accorded by law to motor cyclists generally, the Auto Cycle Union will take whatever steps are necessary to have the conviction quashed.

Yours faithfully,
(Signed) T. W. LOUGHBOROUGH.
Secretary.

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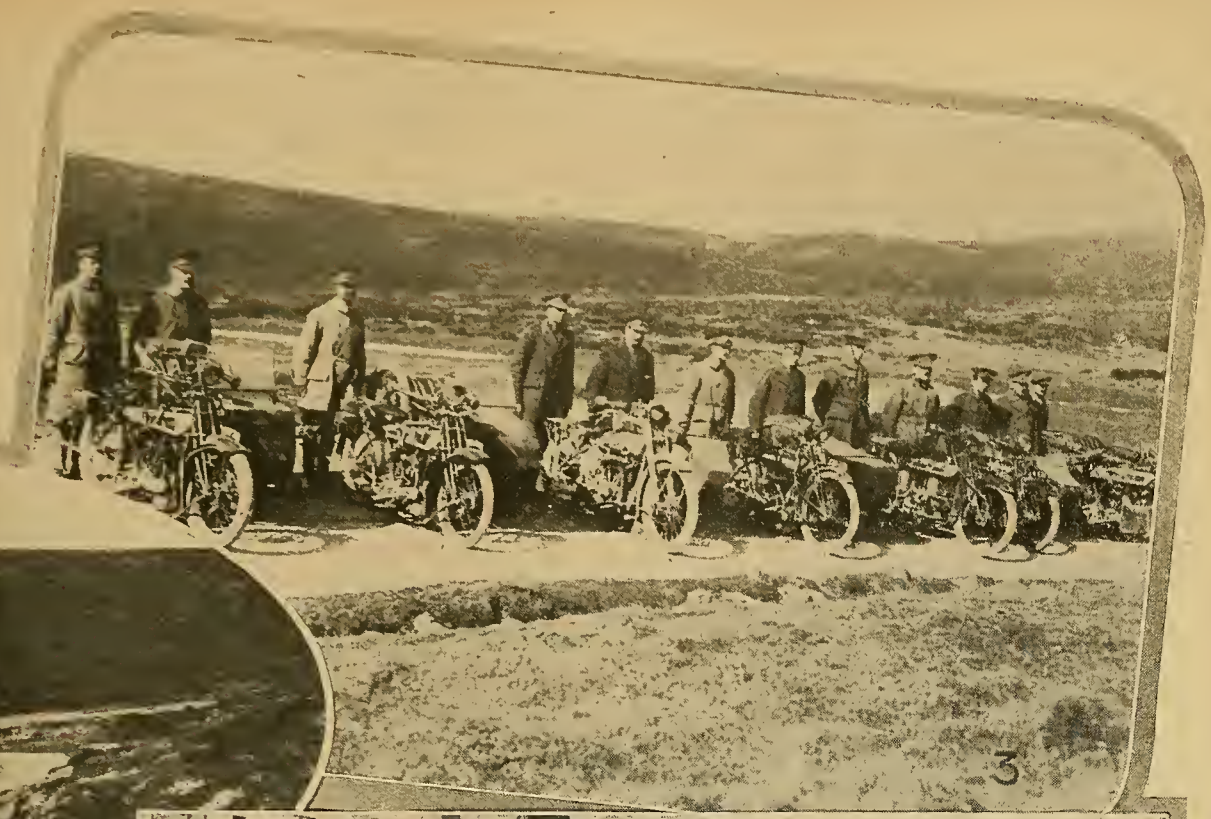

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TIMES TO LIGHT LAMPS.

SUMMER TIME.

May 10th	... ...	9.3 p.m.
,, 12th	... ...	9.7 ,,
,, 14th	... ...	9.10 ,,
,, 16th	... ...	9.13 ,,

Yet Another!

Another Russian military model is illustrated this week. The new type Royal Ruby should make its mark.

The National War Funds.

At the week-end the principal war funds stood as follow :

The National Relief Fund (distributed £3,608,015)	£6,111,575	0	0
British Red Cross Fund	6,563,042	18	8
Tobacco Fund	129,117	0	0

Russian Military Models.

Regularly, as our readers well know, the first available descriptions and illustrations of new models appear in *The Motor Cycle*. This week's description of the new design Royal Ruby for the Russian Army brings the list of Russian models recently described to seven. The names and dates are appended :

Royal Ruby ..	May 10th, 1917.	Page	421
Sunbeam ..	,, 3rd, ,,	,,	402
Rover	April 5th, ,,	,,	299
A.J.S.	,, ,, ,,	,,	309
New Imperial..	,, ,, ,,	,,	316
Norton	March 22nd, ,,	,,	262
Enfield	,, 8th, ,,	,,	211
	,, 1st, ,,	,,	191

Strengthening Frame Design.

On this page there appears an illustration of the patented system of strengthening the front down tube employed on the Russian military model Royal Ruby, referred to in the above. This tube, it is to be borne in mind, has not only to take direct tension as a frame member, but, further, it has to withstand certain twisting stresses imposed by the drive. On pedal cycles the single front down tube is naturally all that is required, but the motor cycle seems to demand some better arrangement. The triangulated construction here shown is capable of withstanding side strains, thus preventing fatigue of the frame members.

British and American Engineers.

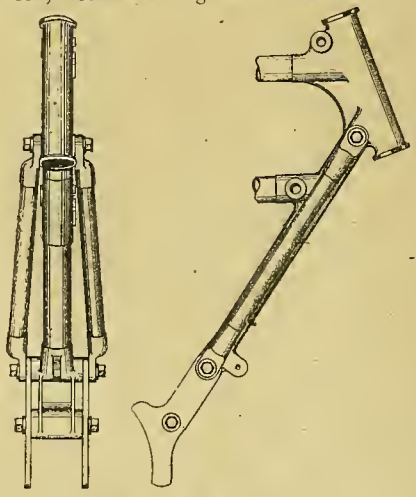
The existing bonds of friendship between the British Institution of Automobile Engineers and the American Society of Automotive Engineers have now been further cemented by the entry of America into the war, as is evidenced by the following cablegram just received in London from America :

"The Society of Automotive Engineers, formerly Society of Automobile Engineers, extends its congratulations to the Institution of Automobile Engineers on its able service in assisting its Government in motor transportation and kindred activities. We consider the farm tractor one of the most potential elements in solving the food problem. Our membership includes tractor engineers of all leading manufacturers, much tractor experience and information is at our command, and in extending our brotherly sympathy and co-operation in the common struggle for democracy we formally place all our data at your disposal, and would be honoured to collaborate in any way you desire. Standardisation in farm tractor manufacture, as well as in airplane and motor boat manufacture, is being pushed vigorously and other activities are being forwarded aggressively. Command our assistance as you desire in the food increase work.—SOCIETY OF AUTOMOTIVE ENGINEERS."

The value of such an offer just now cannot be over-estimated, and the cable was immediately laid before the Government Department concerned and most cordially received.

Travelling by Train.

Travelling by train in these days is a wearisome and costly business, yet there are scores of business men who, deprived of the use of their motor cycles, are to-day forced to make use of the railway. We know of one discharged soldier whose machine cost him about 2s. 6d. per week as a hack to and from business. He is now compelled to make use of the railway, which costs him 4s. 6d. per week, besides taking much more time.



The Royal Ruby patented safety stays supporting the front down tube and connecting the steering head to the engine plates. This is a feature of the Russian model 8 h.p. Royal Ruby, which is illustrated and described on pages 421 and 422

SPECIAL FEATURES.

ANOTHER NEW MODEL.

HINTS TO NOVICES.

TANK MINOR—A SUGGESTION.

Volunteer Motor Cyclists.

Three more motor cyclists are required for the Motor Cycle Section of the County of Middlesex Motor Volunteer Corps, 12th (Heavy) Squadron. Application should be made to headquarters, Market Chambers, Church St., Enfield.

Clynos for Russia.

One of the largest individual shares in the large Russian Government order was allotted to the Clyno Engineering Co., whose sidecar machines are represented on all the fighting fronts. The Wolverhampton works of the firm have been busily employed on a large order for weeks past, the activity in the motor cycle shops being akin to the rush of 1915, when the Motor Machine Gun Service was being equipped with its machine gun sidecars.

A Stolen Motor Cycle.

A motor cyclist, Mr. F. L. Griffiths, writing to us from Coventry, says that whilst visiting a relative's on Sunday last he left his 4-5 h.p. Calthorpe-Jap combination outside the house, and sat down within ten yards of the outfit to take a cup of tea. All the time the machine was in view of the occupants of the room, although the curtains were drawn for a time on account of the sun. On leaving the house, he found his machine missing. Such clever thieving should be a warning, and wake up riders to the risks they take in leaving their machines unattended in the street.

City of London Motor Volunteer Corps.

Full authority has been received to proceed with the registration of vehicles and the enrolment of drivers for the 1st, 2nd, and 3rd Squadrons of the City of London Motor Volunteer Corps, which have hitherto existed as the Mechanical Transport Column of the City of London National Guard. The class of work covered by the corps, apart from compulsory requirements in the event of attempted invasion, consists of the conveyance of troops to working points, the conveyance of arms, stores and equipments, and of wounded soldiers, etc. Still a few motor vans and lorries, private motor cars, and motor cycles are required to complete the establishment of the three squadrons, and those willing to assist are invited to communicate with Mr. F. G. Bristow, 83, Pall Mall, S.W.1.

More Economy in Words.

What is a Starcher? A friend of ours, outlining the specification of his ideal sidecar outfit, refers to a three-speed "Starcher" countershaft gear with all-chain drive—quite a new term for the Sturmey-Archer gear.

An Up-to-date Lorry.

The go-ahead Yankee is applying motive power to every possible use. Sewers and drains now receive regular calls by drivers of motor trucks, who on arrival switch over their engine to a pumping plant.

Dunlop Rubber Company Dividend.

The directors announce the declaration of an interim dividend on the ordinary shares at the rate of 12½ per cent. per annum for the half-year ended February 28th last, payable on the 15th May.

Parent Tyre Company Dividend.

The usual interim dividends have been declared on the preference and ordinary shares at the rate of five per cent. and eight per cent. per annum respectively for the half-year ended February 28th last, payable on the 15th May.

Accessibility.

One direction in which improvement is certainly necessary concerns the matter of internal cleaning. Some oily two-strokes will foul up the inaccessible interior of the best of plugs in a very short time, and the plug, otherwise as sound as on the day it was bought, is probably scrapped. It should be possible to take a plug entirely to bits in the space of a few seconds for cleaning purposes.

Motor Cycle Thieves' Night Raid.

A Matchless solo mount, owned by C. R. Collier, was stolen from outside a house at Plumstead during its rider's visit on Tuesday, 1st inst. The same night thieves broke into a garage at High Road, Lee, S.E., and got clear away with a new Harley-Davidson, owned by T. J. Ross, captain of the Woolwich club and a special constable. Evidence points to the raid being the work of expert organised motor cycle thieves, who are busy in South London. There was only a little petrol in the tank of the Harley-Davidson, and the garage is located in a populous district.

The Cyclist.

The Cyclists' Touring Club has been making efforts to induce the Government to reinstate pre-war conditions as to the lighting of pedal cycles and lighting-up time. These efforts have not met with any success up to the present. We quite fail to see why the pedal cyclist should receive special consideration in preference to other users of road vehicles, but in the matter of lighting-up time it seems to us that his request is not unreasonable, and the concession might be made to apply temporarily to all vehicles, for during the summer it is still quite light an hour after sunset. Sir George Cave, however, replying in the Houses of Parliament when the matter was brought before him, said: "Experience has proved the value of the present requirements as to the lights to be carried on vehicles and as to lighting-up time. I do not think it would be advisable to relax them."

American Import Duty on Motor Cycles.

The duty on motor cycles and finished parts imported into the United States of America is 25%. One of the "critics" recently quoted 45%—the old tariff.

An Absorbing Subject.

The subject of sparking plugs, continued this week by "The Critics," is an absorbing one. Plug designers are up against two difficulties: if the plug points are designed to keep cool they are very apt to oil up, and if designed so as to burn off the oil they are ant to become incandescent. It is, therefore, a matter of compromise.

Ground Clearance for Military Machines.

In our article last week dealing with the new Sunbeam models, the ground clearance demanded by the Russian military specification was referred to as 5in., whereas the passage should have read to the effect that the original ground clearance of Sunbeam twin-cylinder machines was 5in. As, of course, we have stated on several occasions, the clearance demanded by the Russian specification is 6in.

Motor Cyclists as Ploughmen.

Many motor cyclists have assisted in ploughing operations in the different neighbourhoods. It can truthfully be said that nobody is better able to speed the motor plough than a motor cyclist. Between Berkswell and Stonebridge there is a Titan motor tractor at work in charge of R. Lord, who will be recalled by older readers as a leading exponent of Rex machines in their heyday, and many motorists well known in the Coventry district have kept the tractor and the plough busy during the last few weeks. Remarkable progress has been made.

Budding Spring.

Beside us the pale green hedgerows, around us the scents and sounds of spring, under us the little economy mount which, though not speedy, always gets us home in time. But always a thought for the blood drenched paths which others ride, of the grim realities which others face. We at home may be treading the primrose path, but even primroses are beset with thorns.

A New Motorists' Volunteer Scheme.

The R.A.C. is asking for the assistance of motorists to help in the food production schemes which are being organised in the different counties of the United Kingdom. The club's appeal is more especially to volunteers who can devote only part of their time to this class of work, and is made specially to owners of small two or three-seated cars.

While conversing with one of the R.A.C. officials on the matter, we pointed out that we considered sidecar combinations would be equally useful for this purpose, but though he admitted that this was so he did not express any great enthusiasm for the idea. We think this is rather a pity, as a sidecar could be used quite as well for work of this nature, and could be run more economically and more cheaply than a motor car. Possibly in the near future we may hear of developments in this direction.

Voluntary workers for the scheme are allowed free petrol when on duty.

The Size of Wheels.

There is humour in all things, as we recently thought when observing a sixteen-stone rider proceeding over a string of pot-holes on a 2¼ h.p. lightweight possessed of 24in. wheels.

"Wat is Dit?"

Our Dutch contemporary, *Het Motor Rywiel*, has fallen in with the popular movement of illustrating scraps of motor cycle mechanism and leaving the reader to "guess the make." The Dutch title for the competition, which perhaps needs no translation, is as above.

An Alarming Accident.

An A.S.C. motor cyclist at Bath collided with a fire standard, breaking the glass and giving the alarm at the fire station. A motor ambulance was promptly despatched, its arrival no doubt proving timely, as the unfortunate motor cyclist, according to the daily paper report, had fractured his arm.

Average Prices.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the figures for the preceding five weeks. Thus the general trend of the market is visible at a glance, though many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.J.S.	1916	6 combination	—	£96
„	1914	6 combination	£55	£59
„	1916	4 combination	£65	£87
Allon	1916	2¾ 2-speed	£36	£33
„	1914	2¾ 2-speed	—	£28
Ariel	1915	3½ 3-speed	£38	£45
„	1914	5-6 combination	—	£55
Bat	1914	6 3-speed	—	£48
Bradbury	1914	4 2-sp. sidecar	—	£43
Brough	1916	3½ 2-speed	—	£57
„	1915	3½ 2-speed	£45	—
B.S.A.	1916	4½ sidecar	—	£62
„	1915	4½ sidecar	£58	£55
Calthorpe	1916	2½ 2-speed	£31	£35
„	1916	2½ 2-stroke	£29	£23
Clyno	1915	2½ 2-stroke	—	£28
„	1914	6 combination	—	£65
Douglas	1916	2¾ 2-speed	£50	£48
„	1915	2¾ 2-speed	£46	£44
„	1914	2¾ 2-speed	£36	£35
Enfield	1916	6 combination	£78	£78
„	1916	3 2-speed	—	£45
H.-Davidson	1916	7 combination	—	£82
„	1915	7 combination	£63	£65
Henderson	1916	7 combination	—	£100
Humber	1915	6 combination	—	£65
Indian	1916	5 combination	—	£62
„	1915	5 combination	—	£56
„	1916	7-9 combination	£75	£88
„	1915	7-9 combination	£65	£70
James	1916	4½ combination	—	£67
„	1916	2-speed, 2-stroke	—	£30
Levis	1916	2½ Popular	—	£24
„	1915	2½ Popular	£22	£20
Matchless	1915	7 combination	£75	£73
New Hudson	1916	2-stroke, 2-speed	—	£28
„	1915	4 combination	—	£48
Norton	1916	3½ 2-speed	—	£47
„	1915	3½ T.T.	—	£45
P. & M.	1915	3½ combination	—	£65
„	1914	3½ combination	—	£55
Premier	1915	2½ 3-speed	—	£28
„	1914	3½ 3-speed	—	£45
Rover	1916	3½ 3-speed	—	£49
„	1915	3½ 3-speed	—	£21
Royal Ruby	1916	2¾ 2-stroke	—	£28
Rudge	1916	3½ Multi	£42	£45
„	1915	3½ Multi	—	£40
Scott	1916	3¾ combination	—	£60
Sunbeam	1916	6 elec. comb.	—	£110
„	1916	3½ solo	—	£72
„	1915	3½ combination	£80	£77
Triumph	1916	2-speed, 2-stroke	—	£39
„	1915	4 countershaft	—	£53
Zenith	1915	6 Gradua	—	£62

A HUNDRED-MILE MUD-PLUG.

NEW JERSEY M.C. TRIAL UNDER ARDUOUS CONDITIONS.

A Racy Account of a Spring Trial by an American Correspondent, E. B. Holton.

BIG doin's over here in the past few days: about what most of us want, though. Don't see where we'll fit in along the frontier of Civilisation—the Anglo-French line, however. What do we Yanks know about modern warfare? Gotta kindergarten for us to learn the proper methods for exterminating Boches quickly? We're willing, but that lets us out.

Speakin' on and appertainin' to that there New Jersey M.C. "non-stop" contest held March 11th,

The bad condition of the roads as shown in the photographs prevailed for most of the course of one hundred miles. It was a severe test for man and machine.

you sure said a mouthful when you stated as how you'd seen a lot of rules hog tight and bull strong found wanting when the competition was run off. So have I, NOW.

Conditions Changed.

We sure did tie those contestants down: only trouble was we failed to take into consideration weather conditions. I routed and marked the course over clay roads when they were frozen, and it did not need a two days' rain in addition to the regular thaw to make things worse the day the run was held; still we had that aid. Result—we threw out the non-stop idea and penalised each stop or motor stall by a rising scale, *i.e.*, five points for each stop on the first lap, increasing five points at a time to twenty-five demerits on the final round. The winner, Lincoln Holland, jun., on a Harley-Davidson, stopped his motor thirteen times, which is an indication of the wisdom of the change in the ruling—that is, from the standpoint of not allowing the contest to become a fizzle.

To make a long story short, twenty contestants started, five withdrew in the first mile, sixteen were out before the first round of twenty miles had been completed, and it simmered down to a four-cornered fight between one Harley-Davidson and three Indian outfits.

Two Types of Riders.

But one contestant, Holland, made the full one hundred miles required, and he turned in a score of 230 points, being over 4h. 40m. overdue. The second man withdrew after completing ninety-four miles, through tyre trouble, but he was nowhere near the winner, his score standing at 37 points at the time of his withdrawal.

As a clean cut, decisive contest it was a success, but as a run encouraging to the pastime and likely to influence a non-rider to rush into a motor cycle agency and order a machine, it was a decided failure. We have two types of rider in the States: one is the lad who will ride through Hades and back again and think it sport, regardless of his repair bills afterwards; the other is the lad who would not enter a contest if you handed him his award with the receipt for his entry fee, and the worst part of it is the latter lad is overwhelmingly in the majority. Hence the old time spirit of road competitions is on the wane—the new rider does not care to participate in them.

The contest also proved an eye-opener to many of us, for on the day after the contest many of the competing machines were torn down to be decarbonised and overhauled in general, and mud was everywhere—in the crank cases, on the pistons, and in the wheel hubs. Spark plugs, too, were wetted up too frequently during the contest while wallowing through a pool of water, with the result competitor and observer manned the lifeboats and pushed to shore.

As a military machine, fit for all weather and road conditions, the American motor cycle will need some expert's attention, and don't you let any enthusiastic dealer or factory man tell you differently, either. We're O.K. on (clearance only) mudguarding, but that's not all of the battle—there are several other items very important to the running of the machines that need redesigning by the manufacturer.

Here's to the end of Kultur, Krupp, and Kaiser!

The roads were in an appalling state. Judging from the photographs they compare very favourably in their atrociousness with some of the famous roads behind the firing line in France.

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

WHO SHOULD HOLD DRIVING LICENCES?

Sir,—In reply to Mr. Gray's letter of May 3rd, may I state that there is not the slightest difficulty in a one-eyed man judging his distance from two cars, one of which is approaching and the other ahead and travelling in the same direction. At any rate, I have never found any difficulty, and have ridden through the worst traffic in London and other towns more than once.

T. O. C. DOHERTY (2nd Lt.)

SIZE OF MAGNETO.

Sir,—With reference to the letter from "M.B.," in which he states that he fitted the magneto off his Premier to his Sun-Villiers machine, I should like to ask him how long he has run it since, as I fancy he will find that this magneto will very soon break down under the conditions he is now running it. I can quite understand his machine starting somewhat easier and running slower, also being less inclined to four-stroke, since the magneto he is now using is made to give a hot spark at slow speeds; but it is not made to run continuously at the high speed of a two-stroke magneto, and he will find that, owing to the intense electrical energy generated at this speed, it will heat up and probably break down before long.

S. SMITH.

THE SUNBEAM RUSSIAN MODEL.

Sir,—In last week's *Motor Cycle* you were good enough to review the 5 h.p. and 8 h.p. Sunbeam military models, but you criticise the position of the magneto and its chain drive. We, however, are sorry to say that we do not agree with your criticisms. We consider the magneto is fitted in the correct position, and that the advantages far outweigh the slight disadvantage of the longer chain drive. In the position in which the magneto is now placed, it is out of the way of mud and water, being in a far more sheltered position than when placed in front of the engine; besides it is very much higher, and if the machine (as happens in war service, especially in Russia) has to be driven through several inches of water or snow, the magneto is not affected. As a matter of fact the magneto on these military models is placed in approximately the same position as that on the 1914 6 h.p. Sunbeam.

As regards the Sunbeam leg shields, which you say have not been adopted by the Russian Government on the 8 h.p. model, these are unnecessary on account of the specially wide mudguard now fitted, and to which your articles refers as "the excellent front wheel mudguard."

JOHN MARSTON, LTD.
A. S. BOWERS, Manager Motor Cycle Dept.

LARGE FLAT TWINS.

Sir,—Being one of the many who have followed with lively interest your articles and correspondence in recent months of the flat twin, I have repeatedly noticed that the question of its practicability in large sizes has been referred to; the inference being that certain mysterious problems—quite apart from the obvious disadvantage of increased overall length—were somehow to arise with the bigger capacities.

Now these references have left me with the impression that the parties who wrote in that strain had an interest to serve. I may be wrong, but while to my mind you have already amply proved that this idea was erroneous—*e.g.*, by the 1,100 c.c. A.B.C. twin—I might add what is admittedly an extreme instance. The Government of France is in no way behind our own in realising the necessity at present of intensive agriculture, and I have seen a great number of the American tractors which they have imported to speed up their cultivation. Now in every case these had as power unit an O.H.V. flat twin, and "some" twin too, for, admitting that my memory is not too good, I would estimate the bonnet—which the engine entirely filled—to be six feet long. I think we are hardly likely, for motor cycle or cycle car purposes, to need for some time anything much larger.

B.E.F. BRUCE SYME, A.O.D.

THE MOUNTING OF SPRING FORKS.

Sir,—"Spring Fork" is deceived in imagining that I am not acquainted with the Matchless; I know it not only by sight but from having taken it entirely to pieces and rebuilt it; it is besides an excellent machine. I would like to remark that there is no need for Mr. Collier to indicate to me his reasons for mounting forks according to No. 3, for I know these reasons. The Matchless fork is not identical with a Druid fork. I would even add that it would not work if it were mounted like No. 1, the top shackles being longer than the lower ones, and fork not being parallel to the steering of the frame as in the Druid fork. I must add that Mr. Collier would certainly not have been so foolish as to fit upon a machine, as well constructed as the Matchless, a fork which would not act. That is why I did not even think of making an exception of this machine in the remarks made upon the fitting of spring forks in my last letter.

Paris. J. CLINTON SMITH.

Sir,—Your correspondent, "Spring Fork," asks the reason of the arrangement of the links of the "Matchless" spring fork out of parallel with each other. The object is to allow of the path of movement of the front wheel under the influence of road shocks, approximately to coincide with the direction of the resultant of the forces acting on it. Careful tests were made to determine this direction, and the length and inclination of the top pair of links arranged to suit. The object is, of course, the same as that aimed at in the design of spring forks which have a combined up and down, and back and forward movement, with separate sets of springs to control each, but in this case it is attained in a simpler and cheaper manner with the use of one set of springs and mechanism only. The feature is a patented one.

H. A. COLLIER.

AN EXTRAORDINARY ACCIDENT.

Sir,—It occurred to me that the following might be of interest to the many readers of your paper, both at home and Overseas.

A motor cyclist, on active service on the Somme front, while on duty as "line-man"—that is, keeping all telephone wires, etc., between certain specified points in order—had the misfortune to sustain severe injury by reason of an accident which, as far as I am aware, must be, fortunately, rare.

He was on night duty, and, after filling up with petrol, etc., he lit the acetylene lamp (a brand new one), and started on his round. He had only gone a very short distance when, as he puts it, the lamp burst. The whole machine then burst into flame, burning him about the face, and he fell off the machine, pitching heavily, and fractured his thigh badly, resulting in a major surgical operation—plating of the broken bone—and a 3in. shortening of the injured limb.

Now, as a motor cyclist myself, it has always struck me that the usual petrol tank cap of a motor cycle tank is a very imperfect thing, as most of us know how much petrol slops overboard in the first fifteen miles or more on a full

tank. Apart from the wastage, which is bad enough to contemplate nowadays, it is a source evidently of real danger, and electricity scores again.

My letter may have served some useful purpose if it warns other motor cyclists to keep a watchful eye on the soundness and efficiency of their gas lamps.

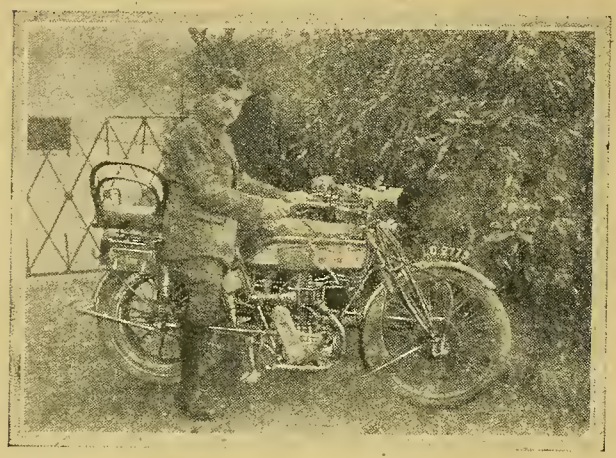
W. FRANK WILSON,
Capt. R.A.M.C. (T.F.).

PARAFFIN AS A FUEL.

Sir,—With reference to your readers' correspondence regarding running on paraffin, I think my two years' experience may be of some interest.

I fitted up my 3½ h.p. Rover to run on paraffin in June, 1915, and since then I have covered over 4,000 miles, always with a sidecar packed with my luggage, in addition to four gallons of fuel and one gallon of lubricating oil on the luggage grid, and during all this time I never had any mechanical trouble and only one puncture (touch wood).

Starting is effected by a small auxiliary petrol tank, connected by copper tubing to a three-way tap, the latter being fitted direct to the top of a B. and B. top-feed carburetter. The paraffin, after leaving the main tank, is led once round the cylinder, between the fins, then connected to the other end of the three-way tap, thus enabling the rider, while riding, to change over from petrol to paraffin and *vice versâ*.



A Rover owner who has found heavy fuels a success when used in conjunction with the device he describes.

My experience taught me that the ordinary brand lamp oil, like "Homelight," "Arclight," or "Royal Standard," is better suited for this purpose, but it must never be heated more than 100°, as it gets too much rarefied, and the charge sucked into the combustion chamber is not sufficiently dense to give the required power.

A hot air intake, a jacketed and heated induction pipe, and a copper gauze cone inside the induction pipe are absolute necessities. I change the lubricating oil in my crank case and decarbonise the cylinder every 600 miles, and have never traced any sign of paraffin in the oil. I have also fitted extra copper cooling fins. I find the most suitable sparking plugs to be Sphinx single-point with asbestos packing gland. My engine runs fairly cool, and has as much power as reasonably can be expected from a 3½ h.p. machine. I can take three up anywhere (except over freak hills), and on a long journey I can always average 20 m.p.h.

I enclose a photograph. Please note the guard on speedometer drive; it is very effective, and it cost threepence (two three-halfpenny tins from a penny bazaar).

A. AGOPIAN.

"SOME" BICYCLE.

Sir,—I imagine "Ixion's" sceptical comment with reference to the climbing capacity of baby two-strokes will provoke more than a few replies from your readers.

Only regular riders of these machines know their wonderful capacity for hard work.

My own machine is a 2¼ h.p. Levis single gear, early 1915. I purchased it when it was twelve months old in good running order. I had never previously possessed a motor cycle, neither had I any experience at all of one, nor of engineering of any kind. My knowledge was practically all secured through the pages of your paper, *The Motor Cycle*, which I had taken and read for some time.

Your readers will know what a hilly country this is (Malvern), yet I ride practically anywhere. I have started cold from below Great Malvern Station and ridden up the centre of the town, Church Street, on to the Terrace, and up the Wyche Road to the cutting (not the Old Wyche), all climbing.

I have ridden from here to within a few miles of Shrewsbury, *viâ*, Kidderminster and Bridgnorth, and taken every hill going and returning. There are two very stiff gradients going north from Kidderminster about two miles out, but I climbed them all right.

On the first one, when going up last summer, I was using a new belt which was stretching, and I got stuck half-way up. I dismounted and shortened the belt, started again, and finished the climb. There is a lovely hill out of Stourbridge towards Brierley Hill which I ride. Once I passed a Harley-Davidson combination stuck on it. I have also ridden over the Lickey Hill from Bromsgrove. I think these are splendid performances for a lightweight and single-geared.

Great Malvern. BEACON.

THE SCOTT AND LONG JOURNEYS.

Sir,—I notice you have had several enquiries at different times as to whether the Scott motor bicycle is suitable for long journeys, and I thought my experience on long rides might be interesting.

My machine is a 1912 with all the latest Scott productions added, *i.e.*, latest type cylinders, 1915 forks, and double sight drip feed. For steering, the Scott forks are superb, and Best and Lloyd's double sight drip feed is most satisfactory.

During the past four years I have made seven journeys from Yorkshire to Aberdeenshire, *i.e.*, about 360 miles each way, and on none of these tours has my mileage been (in ten days) less than 1,500. Out of these seven trips the outward and return journeys on five occasions have been completed within twenty hours.

My last trip in September, 1915, was the best performance of the lot. Leaving home at 3 a.m., I was at my destination, twenty-five miles north of Aberdeen, at nine o'clock in the evening, *i.e.*, eighteen hours. This included four hours' stops, all voluntary, the first being at Carlisle for breakfast (non-stop 110 miles) in just four hours, through fairly hilly country, including Buckhaw Brow and Shap Summit. The next stop was at Edinburgh for lunch (*viâ* Hawick and Galashiels), and on to Granton for the ferry, crossing Fifeshire for the Dundee ferry at Newport. One hour stop in Dundee, then a non-stop from there to Aberdeen (*viâ* Arbroath, Montrose, and Stonehaven). After staying about an hour in the granite city the last stage of my journey was entered upon, the whole being completed in eighteen hours, all stops included.

According to my calculations the 360 miles were accomplished in exactly thirteen hours' riding, which averages out at nearly 28 m.p.h. I am pleased to say this is not an isolated performance of my machine. (On one memorable return journey I was "pinched" twice in one day for exceeding the speed limit, being caught in two traps in different parts of Scotland. This, however, was in pre-war times.)

Mileage for a fortnight's holiday, 1,982 miles, in September, 1915, which included on one day 180 miles out and back trip to Inverness and surrounding district, and on another day a trip up Deeside to the Linn-o'-Dee, and a *détour* was made to have a try at the Devil's Elbow, going from Braemar to the Cairnwell, the highest road in Britain, descending the Elbow, and then making a clean ascent, with sidecar and passenger, on the return trip to Braemar.

I always use my machine with a Scott coachbuilt sidecar attached, and my passenger takes his share in the long spells of driving, which makes it considerably easier in tackling lengthy rides of this description.

I have an extra petrol tank, holding half a gallon, and this is connected to the main tank. I have often the pleasure of doing 100 miles non-stop, my petrol consumption working out, with sidecar and passenger, at a fair average of 50 m.p.g.

Also I often go to Scarborough—sometimes to Liverpool; about eighty miles to either coast. These are nearly always non-stop runs, and as a rule take anywhere from two and a half to three hours for either trip.

I think this is sufficient testimony as to whether a Scott is suitable for long rides. RS 1166.

Bradford.

SLEEVE VALVE MOTOR CYCLE ENGINES.

Sir,—In your issue of April 12th I saw the word "Daimler" mentioned under the heading of Sparklets. This mysterious word set me thinking. After having thought for a considerable time, I began to wonder why there was not a motor cycle with a sleeve-valve engine on the market. I have had a little experience with the sleeve valve engine, and I think if it were fitted to a motor cycle it would save endless trouble of grinding-in valves, etc. The sleeve valve rarely goes wrong, and there would be no trouble with pitted valves, valve guides broken, and such things.

B.E.F. H. J. CANN, Lt. M.G.C.

Sir,—There has been quite a lot of correspondence lately in your paper regarding noisy motor cycles. Although I am much more familiar with cars, I think I am right in saying there is no sleeve-valve engined motor cycle on the market. Why is this? The Knight engine, as fitted to many makes of car, is without equal for durability, silence, and small amount of attention required. The Argyll Motor Co.'s elliptical sleeve-valve combines with all these points a very fine turn of speed.

Nowadays, next to tyres, valves cause most bother, and I am sure it is on account of this that so many people prefer the simplicity of a single. If some sort of sleeve-valve were fitted, four-cylinders would be no more trouble than one. The engine would probably have to be water-cooled, but it would be worth it.

A water-cooled four-cylinder sleeve-valve motor cycle on the lines of the F.N. would, to my mind, be ideal, although perhaps a trifle heavy for solo work. R.N.

DRYING UP.

Sir,—In reference to discussion *re* drying up, overheating, etc., we would offer a remedy which we have found most satisfactory in every case. Take any good lubricating oil and beat it up with an egg beater with one part water to two of oil, and use this to lubricate the cylinders. The result will be no pre-ignition. Some years ago we had a 6 h.p. single-cylinder water-cooled engine which always after a run refused to stop on cutting off the spark (it was not magneto ignition). We tried everything till in a last effort we used the above mixture. We then had no trouble. There was a slight difference in the sound of the explosion, but no loss of power. We figure out what took place as follows: The water in the oil passing into the cylinder being converted into steam caused sufficient cooling to stop the pre-ignition. We have tried the mixture on many engines, both water and air-cooled, with equally good results. Anyone trying this might report results to you, so that your readers may have more confidence in trying the remedy, which we have always found to work. We may say we have used the mixture in various proportions from equal down to four of oil and one of water. There is no magic in the proportions, although we have found one of water to two of oil the most serviceable.

We trust this will be of service to some of your readers.

Edinburgh. ECONOMIC.

TWO-STROKE ENGINES.

Sir,—I should like to make one or two remarks on two disadvantages of the two-stroke engine. The first disadvantage is the comparatively high petrol consumption, and the second the inefficiency at high speeds due to carbon deposit.

In the case of the high petrol consumption, I am of the opinion that this is due to waste of petrol gas, owing to the latter escaping with the exploded gas after the fresh gas has been transferred from the crank case to the cylinder. Doubtless many will disagree with my remarks, but I am confident that, although two-stroke engine pistons are fitted with gas deflectors, a certain amount of fresh gas does escape with the exhaust.

With regard to the carbon deposit, I venture to think that this is mainly due to "foul" explosions caused by a very small quantity of fresh gas mixing with the already exploded gas before the latter has time to leave the cylinder. It stands to reason, I think, that there will be a greater accumulation of carbon deposit resulting from an explosion of a mixture of fresh and already exploded gas than from an explosion of fresh gas alone. Hence at high speed the deposit will be greater, and therefore the efficiency of the engine less. A. F. STUART.

AIR PRESSURE IN TYRES.

Sir,—There has been a good deal of discussion lately in your paper concerning spring frames, and I admit that a *well* sprung frame adds to the comfort of the riding, yet I am afraid the extra weight would be a great drawback, as far as I am concerned.

Being a doctor by profession, and having ridden a motor cycle since its inception, I think that the more simple the construction of the machine the more reliable it becomes.

It appears to me that very few riders give sufficient attention to the care of their tyres. Generally speaking, the tyres are pumped up too hard, making the mounts uncomfortable to ride, as well as placing great strain on the machine.

The tyres should be inflated only sufficiently hard to prevent the rims being damaged through very bad roads, and riding will then become a pleasure.

Very few people indeed know that tyres only *moderately* inflated last longer than those which are pumped up hard.

(Dr.) J. C. O'RAFFERTY.

CALCULATION OF THE POWER OF A MOTOR.

Sir,—So many of my friends have asked me at different times how to calculate the power of a motor that I think the following may be of interest to your readers:

For a general explanation we shall note that d = bore in cm., l = stroke in metres, C = number of cylinders, and N = number of revolutions per minute.

(1.) We shall measure the pressure on the piston at each explosion. The section of the piston is $= \frac{\pi d^2}{4}$. The mean square value of the pressure produced by the explosion, as is well known, is of 6 kg. per cm.^{2} So the total pressure is $\frac{6\pi d^2}{4}$ kg. (F = force.)

(2.) The work produced by the explosion is measured by $F \times l$. It is the general formula of work, l being measured in metres. The product is measured in kgm. (kilogramme metres).

T (the work done by each explosion) $= \frac{6\pi d^2 l}{4}$

(3.) Number of explosions per second. If the motor is running at a speed of N revolutions per minute, the number of revolutions per second is $\frac{N}{60}$. And in a four-stroke motor of C cylinders the number of explosions will be $\frac{N}{60} \times \frac{C}{2}$, for there is only one explosion to two revolutions for each cylinder.

(4.) To have this power in h.p., as we know that 1 h.p. = 75 kgm., we have to divide by 75. As a result we have:

$$\text{H.P.} = \frac{6\pi d^2 l}{4} \times \frac{N}{60} \times \frac{C}{2} \times \frac{1}{75}$$

We can simplify: $= \frac{\pi d^2 l N C}{80 \times 75} = \frac{d^2 l N C}{2000}$

As an example we can take a mono-cylinder motor, 85 × 88, running at a speed of 1,200 r.p.m.

$$P = \frac{8.5^2 \times 0.088 \times 1200 \times 1}{2000} = 3.8 \text{ h.p.}$$

In conclusion, we can see that if we take two motors identical as to the bore and stroke and number of cylinders, but with a different speed, we have:

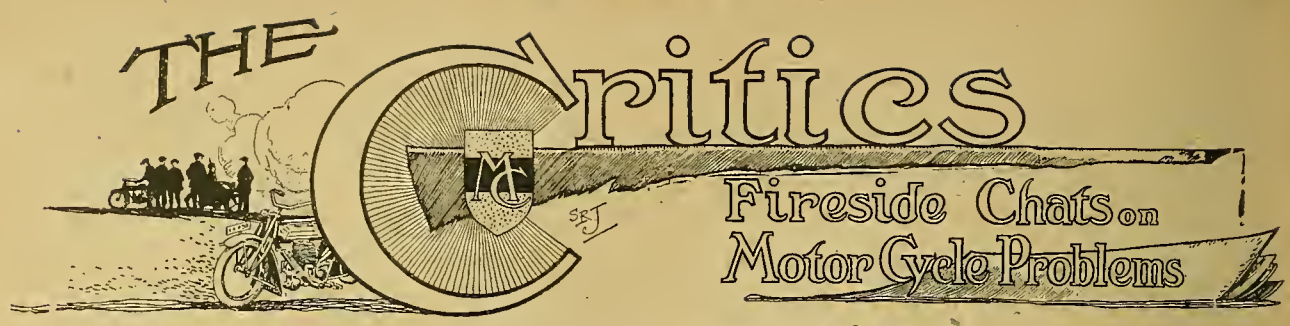
$$\frac{P_1}{P_2} = \frac{d^2 l C N_1}{d^2 l C N_2} = \frac{N_1}{N_2}$$

The power is directly proportional to the speed. Naturally this is only theoretical, and is subject to variations owing to heat, and is only true within the limits where the variation of speed is possible. G. W. PORTEJOIE.

Paris.

[Our correspondent's reasoning is instructive, but it may interest him to know that the formula at which he arrives is in effect the formula well known to motor cyclists in this country under the name of the Dendy-Marshall.—Ed.]

Give a definite order to a newsagent for the regular supply of this journal every Thursday, and so save waste by chance sales.



PLUGS II.

(The first part of the discussion appeared in the last issue, page 401.)

"I MAINTAIN," pursued the Manufacturer, "that from the point of view of the average motorist the present-day plug leaves absolutely nothing to be desired. In a normal engine in touring trim a good make of plug, such as the Sphinx, the Forward, the Reflex, any of them, will last indefinitely. The plug is the last thing you expect to let you down, except for occasional sooting up, which is generally due to cylinder design. In standardised types of four-stroke engines it is practically impossible for a plug to soot up, no matter how you over-oil, whereas I remember a highly efficient modern engine which proved an utter frost owing to the fact that no plug would stand up in it. I repeat, plugs have improved enormously of recent years, and it is now chiefly a matter for the engine designer to place his plug in a cool and sheltered position."

"I agree entirely with the Manufacturer," announced the Novice. "I know lots of men who have handled sidecar outfits, solo mounts, and light cars, but who have never experienced plug troubles; in fact, with the light car, one entirely forgets the existence of the plugs month after month. What more could you wish for?"

"But I maintain that the everyday plug is theoretically wrong in design," stated the D.R.

"Theory doesn't trouble me, so long as the goods prove O.K. in practice," was the Novice's rejoinder. "If it comes to that, many highly practical things in machinery are theoretically wrong."

But the D.R. was convinced.

"You talk about great strides having been made in the perfection of sparking plugs during recent years," he went on vehemently, "and so they have, I agree, as regards durability and the material used. But as concerns design, practically no alterations have taken place since the early days, though engines have advanced enormously."

"But you admit that modern engines run much cooler than the old time engine," argued the Novice. "Why, then, must the *plug* have improved cooling?"

The D.R. sighed wearily. "I have already attempted to explain," he said, "that the heat of the surrounding cylinder has practically nothing to do with the overheating of the plug. You may have an engine that runs so cool that it will not fire a match, yet it will overheat an inefficient plug till it tries to run backwards. Do you not see that it is the design of the central sparking point which is to blame, and which becomes overheated? Why? Because it is so often exposed unnecessarily to the heat of the burning gases, while no provision is made for conducting the heat rapidly away from its sparking point, which consequently becomes incandescent."

An Inefficient Design.

"I see," said the Novice. "Now I am beginning to understand why *The Motor Cycle* always recommends plugs with stout electrodes when pre-ignition is experienced."

The Journalist agreed that thick points were less likely to cause pre-ignition than thin, wiry points, because they take much longer to reach the incandescent stage. "But," he added, "even when thick points are used some provision should be made for conducting the heat away from the central electrode. I was looking through a patent specification the other day which covered a design in which the central electrode terminated in a large blob which actually protruded into the cylinder. The blob was exposed to the full heat of the burning gases, while no provision was made for conducting the heat away from it. Consequently it had nothing to do but to accumulate heat till it became incandescent, which goes to show that, no matter whether the points are thick or thin, provision must be made for conducting the heat away."

Oily Engines.

"The problem is undoubtedly an absorbing one," stated the Manufacturer. "It comes to this—according to your way of argument—that thick points are desirable for cool running, since wire points become incandescent. Now, on the other hand, you must have thin wire points with many engines in order to burn off the oil—a plug with cool points becoming oiled up, as, for instance, on the Scott machines in recent T.T. races. How are you going to compromise?"

"The Scott people compromised by using a plug with a very fine platinum wire electrode," said the Journalist, "but in which the wire was embedded in the insulator, so that it was not exposed at all to the hot gases, the spark alone burning the points clean."

But the Manufacturer was very sceptical. "I do not think that design is practical," he said. "I remember the plug well, but the heat of the central wire was so terrific that it invariably cracked the insulator."

The Journalist pointed out that the matter of design could only be settled by long and practical test. "I do not contend that the particular plug referred to was ideal; still it did not possess certain weaknesses conspicuous in many British designs, and it had the enormous advantage in that it could be taken to bits and cleaned internally in a few minutes."

"And that certainly is an enormous advantage," said the D.R., "especially with regard to a two-stroke. Of course, most plugs can be taken to pieces, but the trouble lies in getting a gastight joint on putting them together again. I have on my shelf at home more than a dozen plugs of the enamel joint variety, varying in price and quality up to 12s. 6d., and most of which have seen considerable service in four-stroke engines. My two-stroke runabout has put at least half of these plugs out of action in a few weeks. All of them are still perfect, except that their innermost recesses are bunged up with carbon, with the result that they short, and the annoying part is that they are not designed to be taken to bits and cleaned."

"Which," pointed out the Manufacturer, "backs up my previous argument that engine design is at the bottom of 90% of the plug troubles experienced. Either you are grossly careless in the oiling of your two-stroke or the designer ought to make another like it and then—switch off!"

Wide Revision Necessary.

The D.R. was compelled to own that the Manufacturer had him there.

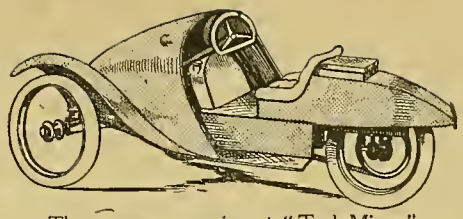
"I do not believe in plugs which can be taken to bits in a few seconds and cleaned," the Manufacturer pursued. "The ordinary novice can never get this type of plug gastight, and if there is the slightest leakage oil is carried through and the plug shorts. I say that the cylinders ought to be arranged so that the plugs keep dry, which is up to the engine designer. We could then use the enamel joint variety, which are doubtless *the thing*, with perfect success."

The Journalist thought that the whole plug should be made much larger, in which case there would be no trouble about the joint or anything else. "As regards present day plugs," he added, "the Lodge racing plug very nearly hits the mark. It falls short of perfection only in one respect—that it cannot be taken to bits and cleaned in a few seconds, with the result that it is off the boards for two-strokes with slipshod oiling systems. Something on the same lines made to take the place of the valve cap and to take to bits would be absolutely ideal."

Here the Journalist sniffed loudly, which meant "I have spoken. Kindly pass the cigars and help yourself to the soda water."

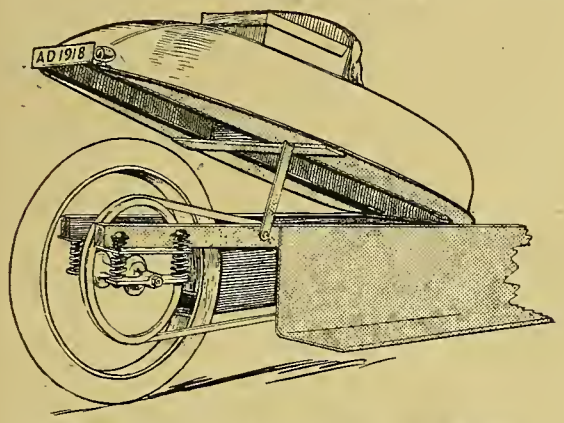
"TANK MINOR"—A SUGGESTED FEATHER-WEIGHT MONOCAR.

An Alternative to the Single-tracker for Winter Riding.



Three-quarter rear view of "Tank Minor."

WINTRY weather conditions show clearly the need for a stable machine for roads thick in mud. For instance, my Douglas is fitted with a Kempshall non-skid on the back wheel which is slightly larger than the tyre originally fitted, with the result that the tyre clearance (never large enough) is now so small that the mudguard chokes with mud and positively stops the engine when the



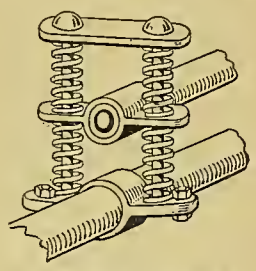
The hinged portion of the body. Note the rear suspension.

mud is of the "packing" description, and has to be cleared every few miles (and it is no joke cleaning the mud from a tight fitting guard with side flaps, especially on the belt rim side). In snow it is worse still, the mudguard having to be cleared every mile, with the result that I recently actually had to resort to a pedal cycle, with its relatively greater mudguard clearance, for some of my business journeys (journeys which take me a good deal on by-roads much cut up by farm traffic now and never very good). The partial thaw after the first fall of snow left these by-roads in an awful condition, the worst for some years, then came the bitter east winds and blinding sleet to demonstrate more conclusively, if possible, the fact that the motor bicycle is not a comfortable vehicle for all-weather winter travelling on muddy by-roads, whatever the ultra-enthusiasts may have to say on the subject.

A Transferable Power Unit.

What is desired seems to be some arrangement such as that suggested by "Ixion" in *The Motor Cycle* some time back by which the power unit could be transferred for the winter months from the ordinary cycle frame to that of some sort of three-wheeler giving more protection than the motor cycle can possibly afford. (Query: Would this constitute two separate vehicles then, requiring two sets of numbers and two licences?)

Being at present laid up with an internal chill incurred whilst motoring during the recent varying weather conditions of snow, slush, sleet, and biting east winds, it is only natural that I should turn my 'prentice hand to designing some such vehicle as would give better weather protection while retaining as far as possible the general handiness and lightness of the motor cycle.

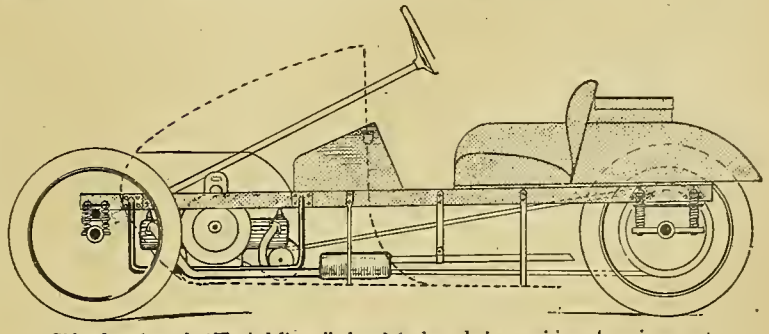


The front suspension, similar in principle to that of the rear wheel.

The result of my cogitations is seen in the accompanying sketches, which I hope are largely self-explanatory. The points aimed at are extreme simplicity, minimum weight, and easy starting (as my business often necessitates twenty or thirty calls a day, some only a few hundred yards apart), using my present flat twin engine for the motive power.

The Chassis.

The frame consists simply of two ash members (strengthened with flitch plates where necessary), which run fore and aft the whole length of the vehicle, and to which are hung by metal brackets the two footboards, which curve up at the front and form practically the whole of the "under-body." The engine and gear box (in the same relative positions as on the Douglas motor cycle) are bolted on a curved tubular frame fixed to the cross tubes which connect the two ash members. The only difference from the ordinary Douglas transmission is that the belt is much longer. The combined oil and petrol tank rests on the ash members, the oil occupying the right-hand rear part of the tank, with drip feed at side or top (unfortunately the oil pipe would be rather long, but could be made of slightly larger section than usual). No kick starter is needed, an ordinary running start being used with jump on to the footboard, the side of the seat being hinged so as to drop down for easy mounting. Of course, a clutch and kick starter could



Side elevation of "Tank Minor," showing the relative position of various parts.

"Tank Minor"—a Suggested Featherweight Monocar.—

easily be fitted, and can be arranged so as to be operated while standing on the footboards, and the back part of the vehicle could then be closed in if desired, but, as the three-wheeler would be very little, if any, heavier than an ordinary 3½ h.p. machine, a running start would be easier.

The Body.

The body, seat, and back mudguard (with toolbox on top) would be made of three-ply wood, and the mudguards and toolbox would be made to slide off for tyre repairs. The top and sides of the so-called "body" are fixed to each other and are free to revolve round the front cross tube, which runs through the two ash members and also through the two sides of the body, so that the body can be lifted over for engine adjustments, being fastened down at the rear with two thumbscrews, one on each footboard. A removable U-shaped metal shield fits over the engine, while the remainder of the sides of the "tunnel" in which the engine is placed is enclosed with enamelled leather or waterproof fabric.

By lengthening the framework a seat for a second passenger could be placed between the driving seat and the rear mudguard, the seat being placed cross-ways but inclined so that the passenger is facing half-front with both feet resting on one of the footboards.

Suspension.

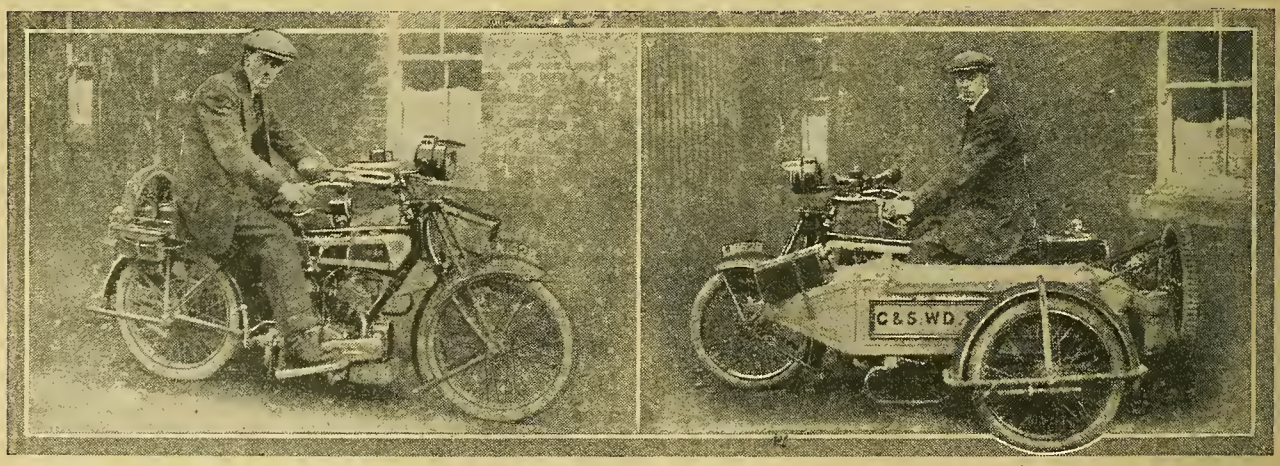
The suspension is by opposed coil springs fore and aft—two each side at the rear and two each side at the front, the latter being placed outside of the body between the axle and the projecting front cross tube. Steering would be by wheel and bobbin or direct, the throttle and air levers being placed on the steering half-wheel, ignition control on the steering column (or also on the wheel), front and rear brakes operated through Bowden wire by left and right pedals—or, if a clutch be fitted, this would be operated by left pedal and hand brake fitted to front wheels instead.

This vehicle would be a real featherweight monocar, following motor cycle lines as far as possible. I should be glad of criticism, sympathetic or otherwise. I had intended to try and build some such runabout this winter had time been available. It would be interesting to know if other readers think there is a likelihood of any post-war demand for vehicles such as these, specially designed by motor cycle manufacturers so that their particular power unit can be readily transferred to it for winter riding.

EAST COAST.

Sidecar for Business Purposes.

A HOME-MADE CONVEYANCE FOR GOODS AND SAMPLES.



An A.J.S. commercial outfit, the sidecar of which was "home made." The way the spare petrol and oil are carried is worthy of notice, the tins being held by part of an old chain and a spring, which hooks on to a screw head.

MR. J. S. BOUSFIELD, of Westbury, Wiltshire, writes us as follows: "I have tried all sorts and kinds of motor cycles, but never had such good service as from the A.J.S. shown in the accompanying photograph. I have now had three of this make, a 2¾ h.p., a 4 h.p., and 6 h.p.; the last-named I am now running on half petrol and half paraffin. This machine has run 15,000 miles, and I have had very little trouble except for tyres, petrol pipe blocked up, magneto points requiring cleaning, etc., and such can only be regarded as incidents. I remove cylinders for decarbonising and grind valves in every 1,000 miles. This appears to keep the engine in perfect order, and I believe in plenty of oil. Never have too little oil is my principle. My average running is about 250 miles per week—all weathers. The sidecar fitted is my own make out of old tea chests, etc., and is about half the weight of the average body of the same type. I do not carry a passenger—only samples and small packages; in fact, the machine is used for business purposes only."

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS, LTD.

QUESTIONS AND REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Driving Licences.

Q. Will you please tell me if it is right for the Chief Constable always to date my driver's licence back to the date on which it was first taken out? I do not renew my licence until I want it, yet he always dates it back to 10th March.—J.W.P.

Your licence should be dated from the day on which you take it out. The original date has nothing to do with the matter The Chief Constable is in the wrong.

Graphite as a Lubricant.

Q. Graphite as a lubricant has been mentioned very frequently of late in *The Motor Cycle*. (1.) Is the common or garden household blacklead recommended, or is there some specially prepared for this purpose? (2.) Is this household blacklead good enough to mix with boiled linseed oil for use on screw threads?—W.A.E.C.

(1.) We should hardly think that grate polish is of sufficiently high quality for lubrication purposes in a motor cycle engine. It is better to use such a preparation as Oildag, in which the graphite is extraordinarily fine and is suspended in oil, or Dixon motor graphite. It should be used strictly according to the instructions given by the makers. (2.) Household blacklead is quite good enough for application to screw threads.

Running a Two-stroke on Paraffin.

Q. I have a 2½ h.p. two-stroke, and am adapting it to run on paraffin. An A.M.A.C. carburetter is fitted, which is almost touching the cylinder and crank case, so that the carburetter is warm, especially as I ride only in summer. (1.) For starting, I am fitting small quart tank to hold petrol, a pipe from which goes through the end of the carburetter and drops petrol on spray or jet at the entrance of the air (?) inlet. Is this correct, or should it lead into the float chamber? (2.) I have coiled a pipe from the paraffin tank four or five times round the radiator fins. Would this be likely to overheat the fuel? (3.) Is No. 2 necessary, or would warming the carburetter only be better? (4.) Would paraffin used as above be injurious to the engine bearings with satisfactory combustion of the fuel.—R.J.P.

(1.) Your plan will answer quite well. The petrol pipe can also be connected to the float chamber or the short induction pipe. A few drops at this point will probably cause the engine to start and allow it to continue to run on substitute. (2.) This is quite a satisfactory arrangement, and has been used on many machines. (3.) We should advise you to leave things as they now are. You should either do this or warm the carburetter, but since the carburetter is so close to the engine we think what you have done is sufficient. (4.) If the engine is cleaned out periodically we do not think any harm will ensue from the use of paraffin.

Broken Radiating Fins.

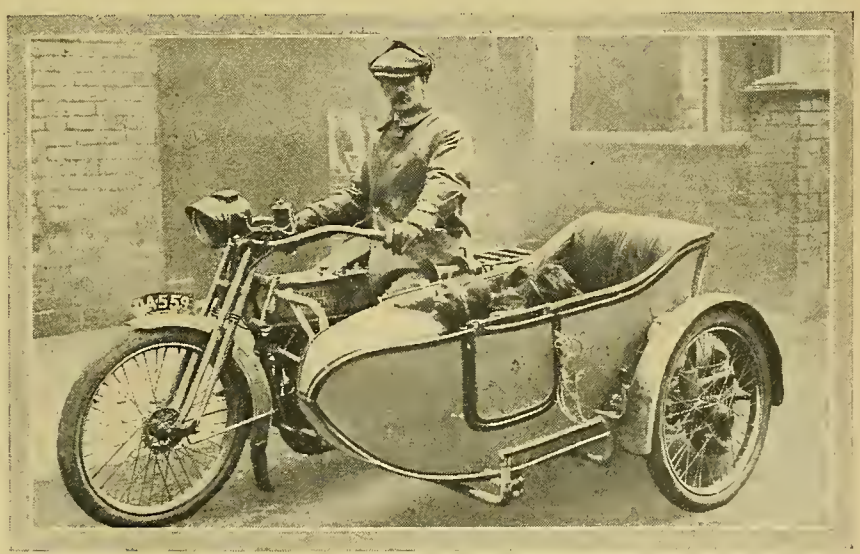
Q. I have chipped the five top radiating fins off my two-stroke engine. The broken pieces are about two inches long. Will this make the cylinder overheat? I still have the pieces. Could these be replaced in the cylinder? Any suggestions from you will be welcome.—CARELESS.

It is quite possible that the broken pieces off your radiating fins may not make any appreciable difference to the heating of the cylinder. You can only tell this after trying the machine. If you do find the engine more prone to overheat the fins should be welded on by a firm of acetylene welders.

Removing the Cylinder.

Q. I have an 8 h.p. Chater-Lea-Jap combination, and recently had the engine overhauled. Now I wish to take down the cylinders, and find that a washer has been placed between them and the crank case, and both cylinders are firmly fixed so that I cannot take them off. I presume that the washers are made of brown paper and seccotine, or some such substance, but cannot find out for certain, as the men who did the work are in France. Can you tell me what is the easiest way of freeing the cylinders from the crank case? As I am single-handed, I do not wish to remove the engine from the frame unless this is absolutely necessary.—A.W.H.

Remove the exhaust pipe, induction pipe, controls, etc., also the holding-down nuts for the cylinders. When everything is clear and free, if you find that the cylinders cannot be lifted off, owing to some preparation being used to stick them down and render the joint oiltight, get a wooden mallet and tap the head of the cylinder *lightly*, taking care not to chip the fins.



THE UTILITY OF THE SIDECAR.

A Shropshire farmer, Mr. A. C. Walker, employs his 7-9 Harley-Davidson for carrying all kinds of produce to market, such as eggs, poultry, rabbits, potatoes, etc. He has also used it to carry calves, lambs, and pigs from market, two calves being in the sidecar at the moment the photograph was taken. We should imagine that the double-purpose sidecar—viz, that from which the upholstery can easily be removed—would be particularly suitable in instances such as this.

Fitting a Two-speed Gear.

I have a 3½ h.p. Triumph with a fixed gear; the date as far as I can tell is about 1908. I do not feel in any way disposed to part with it, having no trouble whatever with the engine, as it runs splendidly. I have been persuaded to fit an N.S.U. two-speed gear. Now can you advise me how to climb successfully? I may say I am running a light wicker sidecar, which the machine takes very well until I reach a sharp hill, when it "konks" right out. My top gear is 5 to 1.—H.K.

We expect that what happens is that you do not quite realise that your low gear is only 33⅓% below the high gear, and therefore to get up a hill satisfactorily you must change speed early, so as to keep up the revolutions. Also there is a distinct limit to the gradients you can climb with this gear with a sidecar.

Pre-ignition.

I have a 1913 3½ h.p. three-speed New Hudson, with which I use a light sidecar. The only fault I find with the machine is a sudden pulling up. The engine suddenly gives a couple of hard knocks and stops dead. This happens sometimes when running along on the level or even down a moderate incline; it is not a question of lack of oil or of heating up, and, what appears strange, immediately it stops I can start off again without any trouble. I thought perhaps that the exhaust valve was sticking, but this apparently is not the case, as lifting the exhaust lever does not free the engine. I should be glad if you could state the probable cause of the trouble and suggest a means to remedy it.—W.H.A.

The trouble is almost undoubtedly due to pre-ignition caused by the use of an unsuitable sparking plug. What happens is that the points become incandescent, and when this occurs pre-ignition sets in and the machine behaves in the manner described. The machine will always start again almost immediately after stopping. Sometimes a flake of carbon in the cylinder head will cause the engine to behave in a similar way.

Magneto Troubles.

Can you please give me a reply to the following: (1.) The contact breaker on the C.A.V. magneto on my machine can be moved about ⅛in. or ⅜in. when the toothed sprocket is held firmly in the hand. Will this hurt, and how could I tighten it up? For timing I pull the contact breaker backwards till tight and then time as usual. (2.) A friend has a Bosch magneto on his machine which sparks at the points. Would this cause the machine to stop or refuse to fire? The points are much worn, in fact nearly all the platinum is gone.—H.S.H.

(1.) The sprocket wheel is doubtless loose on the shaft. The timing should be checked, and the nut holding it on its cone fixing should be tightened, or you should note if the centre screw which holds the contact breaker on to the armature-shaft is tight. (2.) Sparking at the contact breaker points is nearly always due to a bad condenser connection or to a broken-down condenser. Naturally when this happens the points become badly pitted. This might account for the machine refusing to fire under certain conditions. It would be advisable to put in new platinum points.

Running on Paraffin.

I have been greatly interested in the many articles in *The Motor Cycle* about the use of petrol substitutes. For the past fifteen months I have been riding a 3½ h.p. 1915 Rover sc. combination, and, owing to the scarcity of petrol, I have been mixing my supply with ordinary paraffin oil in equal quantities. I made no alteration to the carburetter—a B. and B. single jet—and am able to start the engine quite easily—often with the first kick—without priming the cylinder, on the coldest morning in winter. The machine runs well, except that it knocks a little on hills and is rather slow at picking up speed after slowing down greatly on top gear. I have been told that the use of such fuel will injure the engine. (1.) Do you think it will? (2.) Can the fuel, if not vaporised properly, enter the crank case? (3.) Do you advise, under the above conditions, fitting a hot air intake or a vaporiser? (4.) Will too large a jet cause waste of fuel when the throttle is not fully opened?—R.McK.

(1.) The use of paraffin will not necessarily injure the engine if you drain the crank case frequently and fill it with fresh oil. (2.) Yes, because if the fuel is not vaporised properly, it drains into the crank case and thins the oil. (3.) The fitting of a hot air intake or vaporiser would be a great advantage. (4.) Naturally too large a jet would be wasteful.

Dismantling a V.S. Gear.

I have a 1913 6 h.p. Matchless-Jap, fitted with a V.S. two-speed hub. When the gear is in low or free the wheel is very loose. Can you tell me how to dismantle and adjust this gear? I can take out the spindle and the plate with the five pegs, but cannot shift the iron plate on which the band clutch grips.—T.M.

There is no means of adjustment other than the fitting of new bushes, and unless the looseness is very excessive we should not advise you to dismantle the gear for this purpose, since the dismantling of these gears is a very difficult operation without the use of special tools. Messrs. Collier and Sons are unable to undertake the repair of these machines at present owing to war work, but under exceptional circumstances they lend the tools to customers who require them. The gear should be dismantled in the following manner: Remove the free wheel, then unscrew the lock-nut which secures the low speed drum (this has a left-hand thread). Next, by means of the special expanding ring and lever, loosen the drum itself, which has a right-hand thread. Before removing this entirely, screw on to the thread from which the free wheel has been removed a special split nut, which must then be gripped in a parallel jaw vice with the belt rim uppermost. Then remove the high gear operating mechanism, including pusher plates; replace two or three of the springs with their nuts and washers in order to hold the high gear dog plate out of engagement. Next remove the lock ring which secures the belt rim drum (this has a right-hand thread). After this the belt rim drum itself can be removed. It must be understood that the removal of this belt rim drum will require considerable force, as it will be screwed up tightly owing to the drive. The usual method of removing the belt rim is to lash a strong bar to it and use steady pressure. The final dismantling will then be found quite straightforward.

DELAYS IN POSTAL DELIVERIES.

In view of depleted staffs, the curtailment of railway services, and the consequent delay in delivery of mails, readers will greatly assist by forwarding communications (including advertisements) as much as possible in advance of the dates of the issues for which they are intended.

RECOMMENDED ROUTES.

LINCOLN TO LANCASTER.—A.W.

Lincoln, East Retford, Doncaster, Ferrybridge, Aberford, Harewood, Otley, Ilkley, Skipton, Settle, Clapham, Lancaster.

HULL TO BARROW.—E.W.M.

Hull, Beverley, Market Weighton, York, Tadcaster, Harewood, Otley, Ilkley, Skipton, Settle, Ingleton, Kirkby Lonsdale, Milnthorpe, Leven's Bridge, Lindale, Newby Bridge, Ulverston, Barrow.

IPSWICH TO BOURNEMOUTH.—A.M.

Ipswich, Colchester, Braintree, Dunmow, Stortford, Ware, Hertford, Hatfield, St. Albans, Watford, Rickmansworth, Denham, Uxbridge, Staines, Bagshot, Frimley, Aldershot, Alton, Bishop's Waltham, Botley, West End, Totton, Lyndhurst, Christchurch, Bournemouth. Approximately 180 miles.

MARLBOROUGH TO QUEENSTOWN (IRELAND).—M.C.S.

Marlborough, Swindon, Cricklade, Cirencester, Gloucester, Ross, Hereford, Hay, Three Cocks, Brecon, Sennybridge, Llandovery, Pumpsaint, Lampeter, Llandyssil, Newcastle Emlyn, Cardigan, Fishguard. Thence you go by steamer to Rosslare and take the train to Wexford, and proceed through New Ross, Waterford, Dungarvan, Youghal, Middleton, Queenstown.

PORTSMOUTH TO MIDDLESBROUGH.—J.W.McC.

Portsmouth, Cosham, Petersfield, Greatham, Farnham, Aldershot, Bagshot, Windsor, Slough, Beaconsfield, Amersham, Chesham, Tring, Ivinghoe, Dunstable, Ampthill, Bedford, Eaton Socon, just before reaching which you join the Great North Road, continue *viâ* Alconbury Hill, Wansford, Stamford, Colsterworth, Grantham, Newark, Tuxford, Retford, Bawtry, Doncaster, Ferrybridge, Aberford, Wetherby, Boroughbridge, Thirsk, Tontine Inn, Stokesley, Middlesbrough. Approximately 310 miles.

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All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Spares; prompt delivery — Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305

1916 A.J.S., 2¾h.p., 2-speed, complete, Lucas lamps, etc.; £49, like new.—Cross, Jeweller, Rotherham. [X0012

1916 4h.p. A.J.S., 3-speed, kick start, condition as new, Lucas lamps and horn, complete.—Pickering, Mardol, Shrewsbury. [X9219

1914 A.J.S., 2¾h.p., 3-speed, kick start, perfect running order, lamps, complete; £24, or nearest.—Bert Terry, Odiham, Hants. [2518

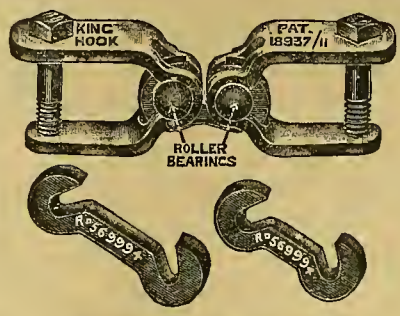
1915 A.J.S. 6h.p. Combination, A.J.S. sidecar, spare wheel, hood, screen, lamps, accumulator, a very fine turnout; £80.—Boyce, 331, Archway Rd., Highgate. [2528

A.J.S. 4h.p. Combination, 1916, with spare wheel, speedometer, hood, wind screen, insurance, etc.; cost £110, done about 6,000 miles, price £75.—Thompson, 37, Prinsep Rd., Hove. [X9997

2¾h.p. A.J.S., 1916 model, 3-speed countershaft gear, chain drive, detachable wheels, includes all accessories, condition like new; 50 gns.; guaranteed.—Wauchope's, 9, Shoe Lane, London. [2544

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796



"Please send 2 7/8 in.

King Hook FASTENERS

- - - they are the only make I have had that have never broken."

So writes a satisfied user—

Why don't you try them?

Detachable 1/-
Adjustable 1/3

FORWARD Motor Company,
35, Forward Wks., Summer Row
BIRMINGHAM.

VEVO
THREE SPOUT INJECTOR
Polished and Plated.
No. 74.
Post Free, 3/3 Net.
For injecting Grease and Heavy Oil into Gear Cases, Hubs, etc. A most useful article for all speed merchants.
Thousands are being supplied to the Government.
Vevo Works, PARK LANE, BIRMINGHAM.

MOTOR CYCLES FOR SALE.

Alldays.

1916 Allon, 2¾h.p., 2-speed, ridden 500 miles; best offer over £30.—181, Clarence Rd., Clapton. [2456

ALLDAYS, new 1917 Allons, 2½h.p., 2-stroke, 2-speed models; £42 cash, or easy terms.—Wauchope's, 9, Shoe Lane, London. [2545

ALLON, 1916, single speed, all accessories, excellent condition, permit 7½ gallons petrol; £28, no offers.—Rogers, 42, Church Rd., Hendon. [2512

ALLDAYS Allon, 1916, 2¾h.p., mag., 2 speeds, countershaft; 29 gns.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [2469

ALLON, 1915, 2¾h.p., 2-speed, E.I.C., tyres as new, complete with all accessories; £26; consider good Douglas part exchange.—Rev. Spittall, Much Marcle, Glos. [X9948

ALLDAYS Allon, 1917, 2-speed, ridden once, owner called up, fitted with speedometer, lamps, horn, everything perfect and unscratched, chain guard, etc.; £40; extended payments arranged.—Service Co., 292, High Holborn, London. [X0049

Ariel.

ARIEL, 3½h.p., 1917, 3-speed countershaft models in stock.—Crow Bros., Guildford. [2562

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

ARIEL, 3½h.p., T.T., 1915, like new, very fast; £38.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [2154

ARIEL, 1917 model, 3½h.p., actually here.—Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N. [2452

IMMEDIATE Delivery of new Ariels, 1917 3½h.p. models, 3-speed countershaft gear, chain-cum-belt drive; £69/10 cash, or easy terms.—Wauchope's, 9, Shoe Lane, London. [2546

1914-15 Ariel 5h.p. Twin, countershaft 3-speed, clutch, and kick starter, fitted with smart coach-built sidecar to match, and completely equipped, very reliable outfit; accept cheaper machine part payment.—Newnham, 223, Hammersmith Rd., W.6. 'Phone: 80. [2529

Auto-Wheels.

BARGAIN.—Tandem and Auto-Wheel, nearly new; £15.—41, Hanover Rd., Broad Lane, South Tottenham. [X9975

AUTO-WHEEL and Cycle, very fast, just back from makers; trial; £9/9.—134, Northcroft Rd., West Ealing. [2464

AUTO-WHEEL, B.S.A. model; £8/10.—Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green. [2450

Bat.

BAT-J.A.P., 6h.p. T.T. Model, guaranteed sound, new tyres; £25.—52, Second Av., Selly Park, Birmingham. [X0005

1913 6h.p. Bat Combination, 2-speed, clutch, kick start, spring frame, been stored since beginning of war, mileage under 3,000, as new; £45, great bargain.—Stone, 130, Cheltenham Rd., Bristol. [2498

Blackburne.

BLACKBURNE, 3½h.p., 3-speed gear, fitted with all available accessories, large outside flywheel model, with sporting sidecar; £50; extended payments arranged.—Service Co., 292, High Holborn, London. [X0051

Bradbury.

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage, and Swan sporting sidecar; £59/10.—Motor Exchange, Horton St., Halifax. [2403

BRADBURY, 1914, 4h.p., 2 speeds, kick start, Bosch, Binks, coach sidecar, new Dunlop tyres, fully equipped; £33; would separate.—61, Commercial Rd., S.E.1. [2488

Brough.

3½h.p. Brough, twin-cyl. opposed engine, countershaft 3-speed gear, 1915 machine, speedometer, and all accessories; £46.—Wauchope's, 9, Shoe Lane, London. [2547

BROUGH, 1916, 3-speed, practically new, in excellent condition throughout, and very fast; £60; extended payments arranged.—Service Co., 292, High Holborn, London. [X0059

BROUGH, new from makers Aug., 1916, 3½h.p., T.T. model, countershaft 3-speed, hand controlled clutch, very fast and smooth running, in perfect condition, done about 600 miles, takes sidecar; price £55 cash.—Box L3,621, c/o *The Motor Cycle*. [2487

Brown.

BROWN, 3½h.p., a most reliable little machine; £18; extended payments arranged.—Service Co., 292, High Holborn, London. [X0041

B.S.A.

B.S.A. New 1917 Models H and K actually in stock.—Moss, Wem. [2388

COLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rne Rivoli.

The Petrol Position.

TOWARDS the end of last week certain daily and evening papers saw fit to draw public attention to the shortage of petrol by unwarrantable attacks on both the Petrol Control Committee and the private motorist in a manner which shows that the main object of these diatribes was to stir up class hatred by taking up an anti-motoring attitude. All motorists know that the submarine campaign is robbing us not only of food for our bodies, but also of food for our engines. In both cases the supplies must be maintained to the fullest extent for those to whom the need is greatest.

Just as the fighter must have his proper supply of food, to the privation of the civilian, so must the army motor vehicles—be they cars, lorries, aeroplanes, tanks, or motor cycles—get their full share of fuel.

In the daily papers referred to the Petrol Control Committee was blamed for renewing licences indiscriminately for private cars and 20,000 motor cycle licences for two gallons a month, and it was stated that the whole committee intended to resign. To show how much reliance can be placed on the statements of these journals on the petrol position and motoring generally we quote the following paragraph, which, of course, had to appear, though letters to the Editor pointing out the true state of affairs were ignored.

> "The attention of the Petrol Control Committee has been called to various statements in the press to the effect that the powers and duties of the committee are to be transferred to the Ministry of Munitions, and also that the number of motor spirit licences renewed for private cars is between 40,000 and 50,000. These statements are declared to be totally unauthorised and without foundation."

The Petrol Control Committee has not been without fault, and has deserved severe criticism—criticism which those who knew the true facts did not hesitate to give—but to accuse it of committing errors of which it is not guilty is entirely inexcusable. There is little doubt that motorists will have to make still greater sacrifices than they have had to up to the present, but they will make them cheerfully when required.

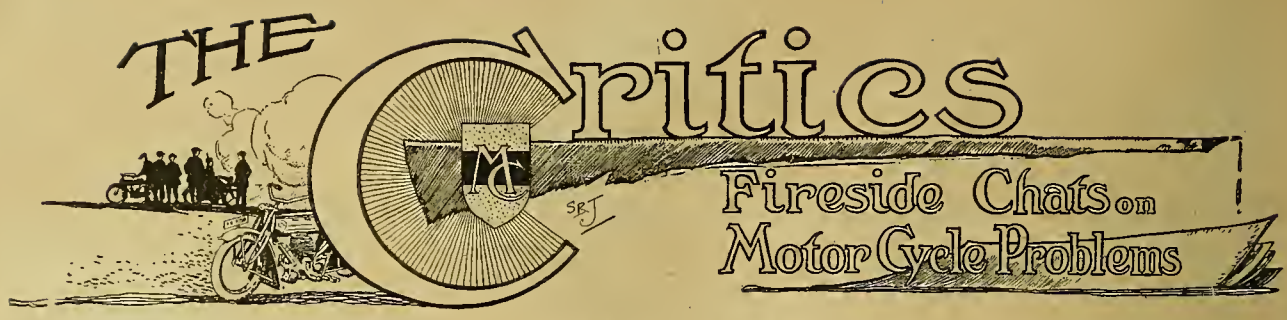
A British Motor Fuel.

MOTORISTS of the present day are not likely to forget the difficulties they have experienced in obtaining petrol, nor the way in which the price of this fuel was increased by the petrol companies, and will consequently welcome gladly a home-produced fuel, if it can be supplied in sufficient quantities to meet their needs. Before the war benzole was a popular fuel with many, but some had prejudices against it because it had a bad effect upon enamel. On the credit side: it did not cause an engine to knock, and it gave more miles per gallon than petrol.

Now it is common knowledge that all benzole was commandeered by Government at the beginning of the war for the manufacture of explosives, and also that the benzole-producing plants in different parts of the country were considerably increased and multiplied. It would be a thousand pities if these plants were allowed to become idle at the cessation of hostilities, and therefore an article which we publish in this issue should be read with more than usual interest.

The writer points out that, while pure benzole will always find a ready sale, not only to experienced motorists, but also for the manufacture of dyes, it may be more difficult to dispose of the toluol and solvent naphtha, other derivatives of crude benzole which have higher flash points than pure benzole. He has, therefore, made experiments with a fuel consisting of all three constituents; in other words, with the total distillate of crude benzole, with most satisfactory results. It is hoped that the extended use of this fuel will keep the benzole plants busy and enable the producers to increase rather than curtail their output.

An index to the advertisements in this issue will be found on the page facing the back cover.



OVERHEAD VALVES.

THE Novice had, that afternoon, been given a ride on an overhead valve twin, and was literally carried away by the superior efficiency of this type of engine compared with the side by side valve variety. "What gets over me," he announced, "is that makers generally stick to the ordinary side by side valve when the overhead system gives such a marked increase in power."

"You can guess that they have some good reason," returned the D.R. "But let us be quite clear on the point. There are, of course, several different ways of arranging poppet valves. There is the side by side, there is the exhaust over the inlet and *vice versa*, there is the system whereby the valves are set at opposite sides of the combustion head, and there is the complete overhead system. Now what you want to know is why makers do not generally adopt the complete overhead system, racing fashion, instead of the ordinary touring side by side."

"Exactly so."

"Well," the Manufacturer told him, "one good reason is that with the overhead system a broken valve means a broken piston. That probably is the chief reason."

The Journalist said he very much doubted whether it was the chief reason. "The tungsten steel valves of to-day do not break, or what good would a multiple-cylinder aero engine with all overhead valves be? Why it would be suicide to go up in such a machine."

The Manufacturer looked at him curiously. "Don't you let yourself imagine that the overhead valves in aero engines *never* break," he advised.

The Matter of Noise.

The Journalist did not argue the point. "Even so," he agreed, "but I do not agree that the possibility of a broken valve and a smashed piston rules out the principle. Some years ago the Buckingham people introduced a system whereby the valve did not fall into the cylinder even if it broke, and such a design could be made thoroughly practical. Look here; practically all the endurance tests of the world have been won by overhead valve engines. You can take it from me that the racing engine of to-day is, in its improved form, the touring engine of to-morrow. It always has been so."

"That's right, so far as it goes," agreed the Manufacturer. "There are scores of firms who have adopted the overhead system for their racing engines for years past, yet who steer clear of it on their touring models. Can you tell me why?"

"Yes," volunteered the D.R. "Firstly, because it is noisy; secondly, because of the difficulty of lubricating the hot working parts; thirdly, because it requires infinitely more adjustment; fourthly, because an overhead valve engine is never flexible; and fifthly, increased height of cylinder."

"Each of which is merely a defect in application, and is not inseparable from the system," argued the Journalist. "Taking the points in order—noise is generally the result of undue clearances, due to wear, and the wear is due to bad lubrication. The overhead mechanism of the Buick car is dead silent——"

"With a car engine you are up against a different set of factors," the Manufacturer told him. "The working parts are not subjected to heat, and therefore can be lubricated. In the engine you name the rockers are provided with thick felt washers, which feed the bearings with lubricant. If you did that on a motor cycle engine it would smell like a friend fish shop after half a mile."

"How the lubrication is applied is a matter for you manufacturers to decide," returned the Journalist. "Difficulties in the way do not condemn a system—they merely prove that present application is wrong. The overhead system is undoubtedly the thing, and undoubtedly it will come. As regards the matter of noise and flexibility—you are basing your assumptions on the racing engines you have tried—practically the only engines to which the system is to-day applied. Naturally a racing engine is noisy and unmanageable on account of its strong valve springs, its special valve timing, and its high compression—quite apart from the speed it attains. Why, if you tune up a side by side valve engine to racing pitch and run it all out, it kicks up a hideous rattle."

"The Journalist has a convincing way with him," said the Manufacturer, knocking the ash from his cigar. "It does me good to hear him talk, but he lives in an editorial and theoretical atmosphere. Now, look here, old Inkslinger"—this made the Journalist sniff loudly—"an overhead mechanism has just about double the working and reciprocating parts of a side by side system. How in the name of practice and theory can you get it as silent?"

"By enclosing it, by reducing your reciprocating weight and your working parts, by keeping the whole properly oiled. Feed your engine with oil through the tube enclosing the valve operating rod, if you like. Do it as suits your purpose, for you bet your boots you'll have it to do sooner or later!" And the Journalist reached with an independent air for the matches.

"Why not suck your charge through the enclosed valve mechanism and employ petroil?" suggested the D.R. jocularly.

"A friend of mine swears by the overhead inlet valve," observed the Novice. "Such engines, he claims, never require attention to their valves owing to the fresh charge having the effect of cooling the exhaust valve."

But the Journalist was seriously in earnest. "The present defects of the overhead system are very superficial," he said earnestly. "Imperfect lubrication is at the bottom of practically all of them. If manufacturers generally would get away from the idea that the overhead system is necessarily confined to the racing track—if they would concentrate upon it for ordinary touring work, and adapt it for such, it would stand a chance of becoming general. Because it is noisy when designed for a highly efficient engine does not necessarily imply that it cannot be designed to work silently."

Advantages of the System.

"I must say I agree with most of your arguments," allowed the Manufacturer after a pause. "The system at present has defects, but, as you say, these may not be inherent. The possibilities it offers are certainly enormous: increased efficiency, a simple cylinder casting—if cast iron be used—and the absence of a hot side with its resultant warping. It adapts itself naturally to the steel cylinder with separate combustion head, and it is a proposition which may settle the warping difficulty. Still, though the overhead system may become more popular, I doubt whether it will ever supersede the side by side variety."

The Journalist thought it would. "Viewing the system in broad daylight—it is approved in modern aero engine practice, and here the brains of the petrol engine world are to-day concentrated. I repeat—the racing engine of to-day is the highway and byeway engine of to-morrow, and all racing engines of to-day have overhead valves. We are certain to follow aero and racing engine practice. The average rider does not want a racing engine, but he wants high efficiency because it spells cheapness. High efficiency is in every man's favour—whether he be scorcher or rural potterer—because it will enable him to use a smaller engine to obtain given results."

A Ludicrous Derangement.

I RECENTLY referred to a machine owned by a reader which behaved rather oddly. Several other correspondents, owning similar machines, duplicate the symptoms, and I think we must ask the makers to solve the problem. On the level the machines run rather snatchily, being from time to time held back as if by an invisible hand, and then running on again, as if stored energy had been released. Uphill the running is normal. The only attempted solution comes from Capt. Lindsay, who recommends a new contact breaker spring and platina for the magneto contact breaker. I am not a good enough electrician to analyse this suggestion. Can the underlying suggestion be that the "break" is not clean enough when the engine is running easily against a light load, but that the extra pounding of increased throttle uphill puts a jerk on the magneto drive, gives a sharper "break," and enhances the speed and crispness of the "make"? At any rate, several readers will be grateful to anybody who can put their machines right through our columns; and others will be glad to have an authoritative solution of a very queer derangement. Incidentally, some electrician may elucidate for us why a strong contact breaker spring brisks up a machine generally; an electrical ignoramus like myself is apt to imagine that, provided one gets a snappy break, the speed of the return to contact between the platina cannot matter much.

Air-cooled Cycle Cars.

PERHAPS the heaviest blow which air-cooling has received passed almost unnoticed when the Morgan people recently announced that their standard post-war models would be fitted with water-cooled engines. Pending some engineering innovation, the success of air-cooled passenger machines depends mainly on a very high proportion of power to weight, because the risk of overheating arises on hills, and only a light, high-powered machine can take hills fast enough to create a powerful cooling draught and maintain efficient radiation. This, of course, does not imply that the original air-cooled Morgan was not a success from a technical standpoint, but rather that in the last five years the Morgan people have accumulated information as to the nature of the public demand. They find that a majority of users demand a specification which implies a certain weight minimum; this weight minimum is too high to permit of the correct power to weight ratio for air-cooling. So they are lengthening their wheelbase, increasing the comfort of their bodywork, incorporating a few refinements, and resorting to water-cooling. It will be interesting to watch whether certain contemplated post-war air-cooled passenger machines will be driven to a similar solution. At present the sidecar combination stands alone in the air-cooled passenger class.

A Sporting Two-speed Gear Wanted.

WILL some gear maker consider the possibility of turning out a really simple, light, and reliable two-speed gear suitable for sporting models? I have received quite a lot of enquiries, mostly from the younger service men, for a gear of this kind, and the following is a fairly typical type of letter: "I used to run a 6 h.p. single-geared T.T. X—— before the war, and have never had a mount which I liked better. But it used to let me down on the bad hills, especially in bad weather. I had an adjustable pulley, but it was an awful fag to fake the belt length, and when I badly wanted a low gear the belt generally slipped, or else it rained and I could not get a grip at all. I should like another machine of the same type after demobilisation, but I am not going to be bothered with chains and a big clutch, and a heavy gear box, and the usual weighty, family sidecar type of 'bus. Do you know of a light, simple two-speed gear which could be built into a big road-racer twin, without much extra weight or complication?" I might add that one noted speedman advises that such gears should be designed for a foot change, on the ground that it is unsafe to take a hand off the bar at high speeds.

Lighting Dynamos.

I AM not so optimistic about dynamo lighting for solo mounts as my colleague of the "Critics." All my road experience suggests that electrical firms think too highly of their smaller and cheaper batteries. On a sidecar there is undoubtedly ample accommodation for a battery which will stand the work, provided you care to pay a fair price for it, and your maker is honest enough to fit cells which will withstand the heavy discharges. On a solo mount there is precious little room for any sort of battery, and the most careful owners usually find it necessary to get the battery freshened up at the main pretty regularly. Why, the cheaper sets fitted to motor cars can hardly be termed satisfactory. Two of the most painstaking car owners I know are usually in trouble; one has had five new batteries in 12,000 miles (at three batteries to a set), the other is still carrying on with his original battery, but only by dint of freshening it up twice a week. The D.A. cylinders or an ordinary acetylene generator are infinitely preferable to a dynamo set which is going to cause trouble.

THE NEED FOR PAPER ECONOMY.

The only way to ensure regular receipt of this journal is to place a definite order with your newsagent or the publishers.

This action will enable newsagents to limit their orders to the actual number of copies required, and so effect a saving of paper, labour, and railway transport.

DEVELOPMENTS IN THE RUDGE SIDECAR MODEL.

New System of Transmission and other Refinements.

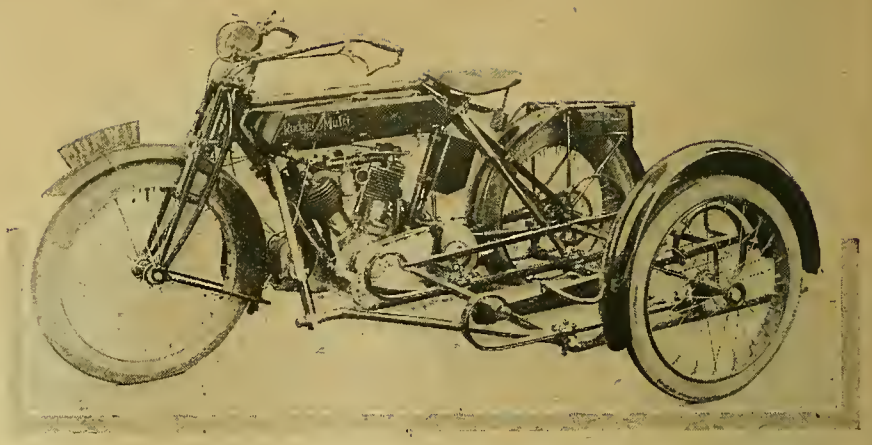
BY the courtesy of Mr. V. A. Holroyd, we were recently able to test and examine the new twin-cylinder three-speed Rudge—a model which, though it has not yet reached a stage of finality, can at any rate be taken as illustrating the fundamental principles of the Rudge post-war sidecar machine.

This is the first move on the part of the Rudge factory in departing from its old principles as regards transmission. Hitherto the firm has pinned its faith to the simplicity of the belt drive, which, though excellent for solo use, has its limitation. Rudge machines in the past have been designed primarily as solo mounts, but the coming of the sidecar model, designed entirely as such, has opened up the necessity for a more positive form of transmission.

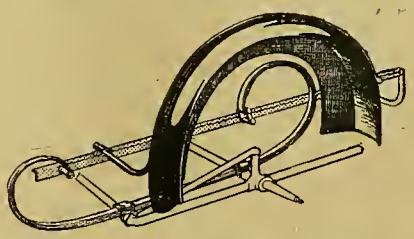
The Rudge twin we were privileged to try is purely an experimental model, and therefore any mild criticisms we may offer must not be taken as of permanent effect.

Specification and Sidecar Refinements.

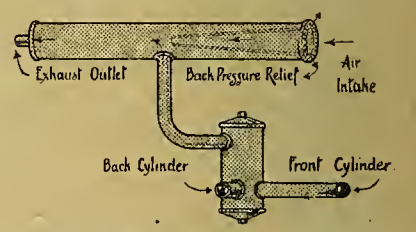
The specification of the new model is briefly as follows: The 7-9 h.p. engine (85 × 88 mm., 998 c.c.) remains practically unchanged; chain drive throughout; Sturmey-Archer three-speed gear; Splitdorf magneto; Senspray carburetter; petrol capacity, four gallons; oil, one gallon. Controls—Carburetter and clutch on handle-bar; ignition lever, on tank; oil pump, foot operated. Exceptionally heavy 26in. × 3in. tyres are fitted, and the sidecar attached to this machine has several interesting features. The sidecar mudguard is attached to the body, so that it obtains the benefit of the springing, this being an excellent point, which might advantageously be adopted as general practice. The exhaust extension from the engine is carried under the sidecar frame, where an additional silencer is located. The oil pump is contained in the one gallon tank situated behind the saddle-pillar, the pump being operated by the right foot through Bowden wire control. By simply depressing the pedal a charge is forced into the engine, and this system is very convenient and easy. The ample dimension of the tanks is a point of convenience in these days of scarcity, and is a feature which will appeal particularly to Overseas riders. The machine is specially adapted to Overseas requirements. The front chain is enclosed by an aluminium cover, the rear chain at present being open. It is not yet decided whether, in the final model, totally enclosed or merely partly enclosed rear chain drive is to be employed. In other respects the new model conforms to standard Rudge practice.



Transmission side of the big twin Rudge. An all-chain transmission has superseded the belt drive, and a three-speed gear box the Multi gear.



The sidecar mudguard and carrier are arranged so that they receive the benefit of the springing—a really good and much-needed feature on sidecars.



The exhaust extension is carried under the sidecar frame, the lower cylindrical box being the expansion chamber and the upper the silencer proper.

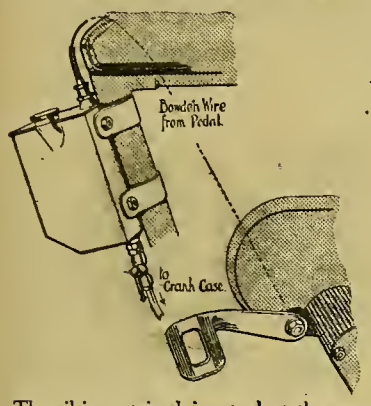
Mr. V. A. Holroyd (works manager of Rudge-Whitworth, Ltd.) and his daughter, Miss Avis Holroyd, now an A.S.C. motor driver, aboard a 7-9 h.p. Rudge sidecar.

The 7-9 h.p. twin-cylinder Rudge combination (85 × 88 mm. = 998 c.c.). A Splitdorf magneto is fitted It will be noticed that the tank does not follow the pattern popular at the present day

On the Road.

During our road trial of the machine we were first impressed by the enormous reserve of power of the o.i.v. engine. We should imagine this engine to be sufficiently powerful for the propulsion of a moderate sized light car. In spite of a top gear ratio in the vicinity of 3½ to 1, the machine was capable of tackling any normal gradient without the least indica-

Developments in the Rudge Sidecar Model.—



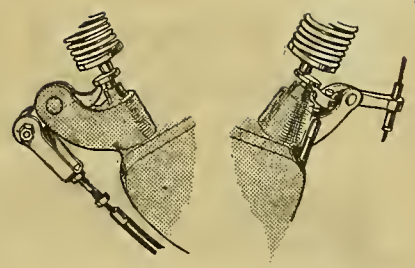
The oil is contained in a tank at the rear of the saddle-pillar.

tion of a decrease in speed. Stoneleigh Hill, for instance, was ascended like level going.

The speed of the outfit on the level was decidedly abnormal. The engine seemed capable of turning over at a high rate of speed, though slight trouble was occasionally experienced owing to the idiosyncrasies of the carburetter. The same trouble was experienced at low speeds, one cylinder indicating a tendency to cut out at a speed under 15 m.p.h. This was evidently due to air leak or want of careful adjustment.

Entire absence of clatter is not, of course, to be expected with overhead inlet valves, and doubtless the clatter of this engine was very much increased at high speeds by periodical clutch slip. This, of course, was a matter of clutch adjustment, but though the exhaust silencing was good, it had the effect of accentuating the noise of the valve gear.

With this abnormally high gear the engine needs to attain its stride ere the transmission becomes absolutely sweet. One of the advantages of a powerful engine is that it enables a high gear to be used, and therefore machines of this type demand a system of transmission more perfect as regards its shock-absorbing qualities than in the case of an engine which obtains its power by means of high revolutions. At low speeds there was a distinct tendency towards snatchiness,

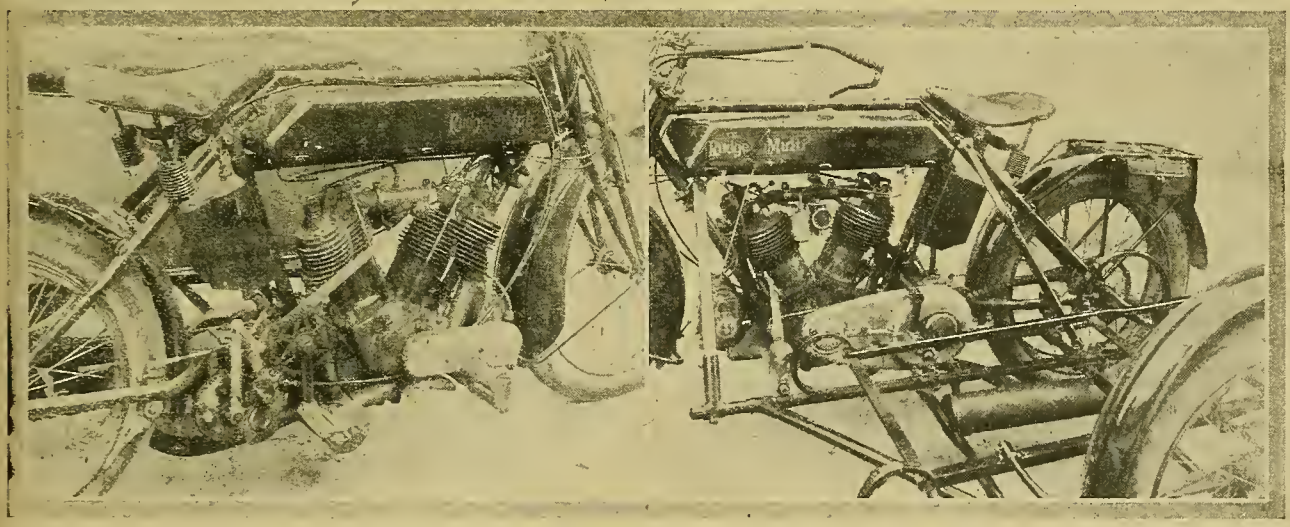


Exhaust valve lifting mechanism.

which, of course, could be relieved by judicious fingering of the handle-bar clutch. Still, an independent shock-absorber would relieve the rider of responsibility, and would add to the general sweetness of running.

The machine is a thoroughly substantial job throughout, and will doubtless make a strong appeal to those who demand a very ample reserve of speed and power.

Strength of construction and solidity of detail design are its recommending features, the outfit being designed throughout for hard work and heavy loads.



Valve side view, which conveys a good idea as to the general lay-out of the power unit. The back footrests are a temporary expedient.

Transmission side of the 7-9 h.p. Rudge, showing the enclosed front drive, and also the supplementary silencer secured to the sidecar chassis.

TEN YEARS AGO.

Extracts from "The Motor Cycle," May 15th, 1907.

IN *The Motor Cycle* for May 15th, 1907, the Tourist Trophy Race was being freely discussed, and it is interesting to glance through the list of entries and note the names of the machines and riders prominent at that time. In those days the singles and twins ran together, the former being allowed a fuel allowance of one gallon for every ninety miles, and the twins one gallon for every seventy-five miles. The course was 107½ miles in length, covered by encircling the route eleven times. Seventeen makes of machines were entered—Matchless, Rex, Triumph, Brown, Minerva, J.A.P., Peugeot, Roc, N.S.U., Silver, G.B., Vindec, Norton, Kerry, Bat, and an unnamed machine entered by the Coventry Motor Club, and another by the Isle of Man Motor Company.

Many of the riders' names are still familiar in the motor cycle world, and some flashed meteor-like across the sky at that time and were heard of no more. Among the more famous riders were Harry Martin, T. H. Tessier, the late O. C. Godfrey, C. R. and H. A. Collier.

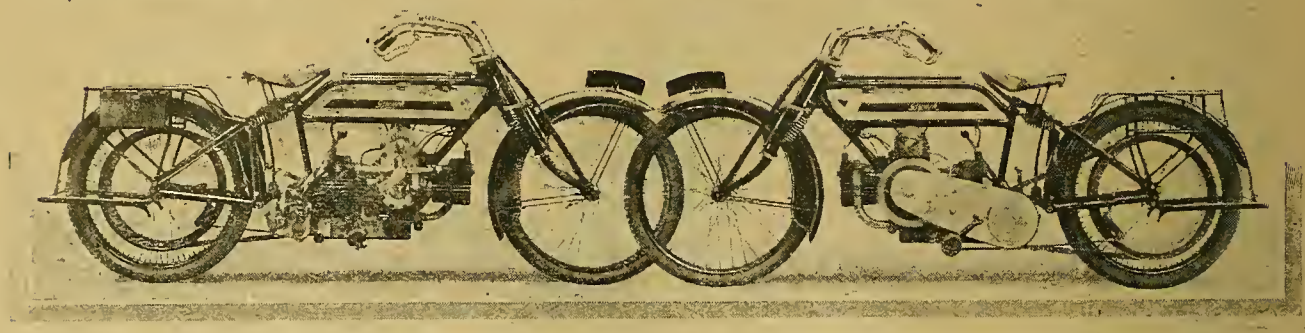
The single-cylinder class was won by C. R. Collier (3½ h.p. Matchless), and the twin class by H. R. Fowler on a 5 h.p. Norton. The race was run on Tuesday, 28th May, over the St. John's, Ballacraine, Kirk Michael, and Peel route.

Exports of Motor Cycles in April, 1907.

During April, 1907, we exported 224 motor cycles and parts to the value of £5,695. Last year our export figure for March was £80,328, and for the same month this year £78,850. A 1,400% increase in ten years, in spite of the war, shows that our Overseas trade has received more attention than some people would have us believe.

A SPRING FRAME FLAT TWIN BROUGH.

Side-by-side Valves and Spring Frame adopted on a New 3½ h.p. Model.



The new flat twin spring frame Brough of 3½ h.p. Side-by-side valves have superseded the overhead system. The engine dimensions are 70 × 64·5 m.m. = 497 c.c.

A RECENT visit to the Brough works proved of unusual interest, for Mr. Brough had two entirely new flat twin models for our examination and trial. Perhaps the more interesting of the two—certainly from a journalistic point of view—was the new 3½ h.p. three-speed spring frame model.

During the past few months we have illustrated more rear springing systems than one can recall—some promising, some obviously lacking in mechanical efficiency, others more or less practical, but cumbersome and ugly. Mentally one divides the present systems into three classes—good, bad, and rotten—and at the first glance one sees that the Brough spring frame belongs to neither of the two last categories, an impression which is speedily backed on closer examination. In brief, the system of springing employed on the new Brough ranks with the foremost, and is a practical and promising design, which conveys a general impression of permanency. It is not ugly; the weight of the frame complete is very little in excess of the standard rigid frame, and as regards the difficult matter of lateral rigidity, the device seemed to be in no way lacking.

System of Springing.

The system is most clearly illustrated by a simple line sketch on the next page. The triangle ABC represents the rear portion of the frame, supported by the wheel at B, and mounting the carrier as shown in dotted lines. It is pivoted at C to the spring portion of the frame—carrying the rider, power unit, gear box, etc.—by means of a long and massive phosphor bronze bearing, provided with lubricating cups. The base of the leaf spring E is substantially set in the spring portion of the frame at D, while at its upper extremity A it slides between large rollers, which are provided to reduce the infinitesimal amount of friction that occurs. Between the sprung and unsprung portions of the frame at A there extend tension coil springs, which perform no other function than that of deadening rebound. It will be seen, therefore, that the up and down motion of the back wheel, as indicated by the arrow, is met by the spring through the rollers at A, the triangle pivoting radially from C, and, further, that the strains imposed fall in line with the sides of the triangle, *i.e.*, there are no intermediate bending stresses.

Lateral Rigidity.

This design has several points of recommendation. It necessitates the use only of one light leaf spring—the spring used being a little thicker, though somewhat wider, than a good sidecar spring, so that weight is not excessive. The point of support being high up, the bearing at C is much assisted in its work of keeping the wheel perfectly upright in the frame when side strains are imposed, and there appears to be no tendency whatever for the wheel to move out of vertical alignment.

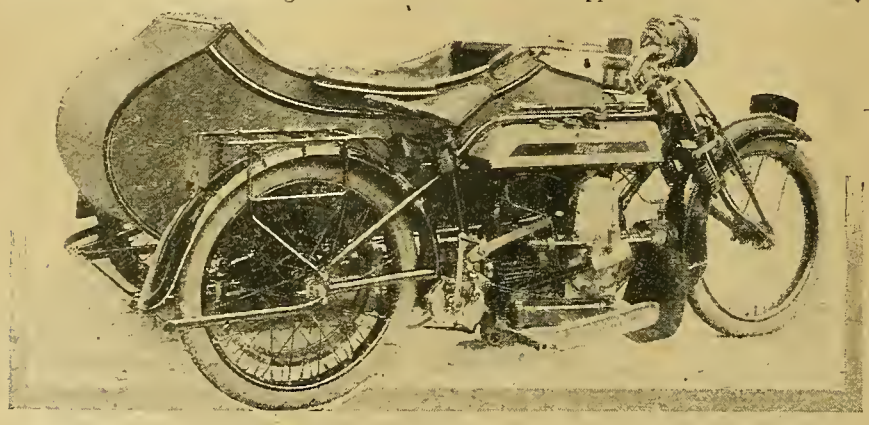
Lateral rigidity is further assisted by the spring itself, which is a carefully ground fit in its housings at both ends. It is, of course, rigidly secured to the sprung portion of the frame at its base, while at its thin end the housing which carries the rollers is so arranged that any side-thrust is met by the case-hardened edges of the leaf spring, so that not only does the spring bend to give the necessary motion, but also it resists sidewise motion, thus assisting in maintaining the upright position of the wheel in the frame.

Departures from Brough Standard Practice.

This 3½ h.p. spring frame solo model is quite a new departure from standard Brough practice in many respects, as also is the new 5 h.p. rigid frame sidecar model (70×90), though as regards general layout the same principles have been applied to both almost throughout.

Mr. Brough's reasons for departing from the overhead valve system, which has been a special feature of Brough engines hitherto, is not the result of wavering faith, but is merely the outcome of a desire to produce a machine which calls for an absolute minimum of attention. There is no doubt that the overhead system is the better as regards speed, but on these engines, which are capable of attaining an astounding rate of revolution, the overhead mechanism demands decidedly more attention than the everyday system of side-by-side valves. In the new models, therefore, the aim of the designer has been to sacrifice ultra engine efficiency for all-round efficiency and a minimum of adjustment.

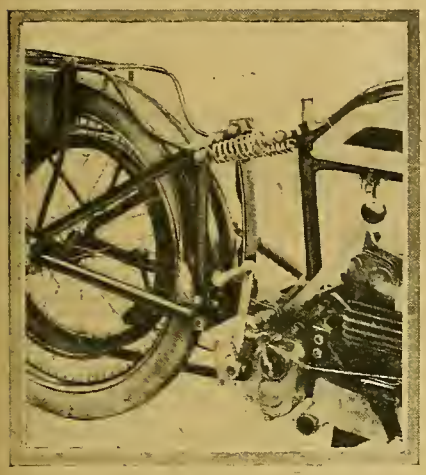
On both these models lubrication is by suction drip, controlled from the tank, and assisted by a hand pump. The oil enters at the top of the timing case, where it is caught by a trough, which latter is provided with two overflow lips, situated directly above the big end bearings. The oil, therefore, overflows the troughs, drips on to the big ends, and thence finds its way into the sump, which is sufficiently spacious to contain at normal level one pint of lubricant, so that there is no danger of the engine drying up suddenly.



The 5 h.p. Brough combination, differing from the previous 5 h.p. model in the matter of transmission and minor details.

A Spring Frame Flat Twin Brough.—

The back cylinder is shielded from over-lubrication by a baffle, the front being open to the crank case. One noticeable feature of the 3½ h.p. as well as



The rear springing of the 3½ h.p. Brough. A flat leaf spring is used in conjunction with a pair of coil springs. The carrier, it will be observed, is not sprung.

the 5 h.p. engines is their external cleanliness, there being no sign of waste oil, even in the case of a new engine which is kept flooded. Indeed, there are few joints from which oil can escape.

Engine Details.

The engine is remarkably substantial throughout, the crank being a particularly massive piece of work. The weight of the crank is such that on both models an unusually light flywheel can be used and it is supported at either end by roller bearings, augmented on the driving side by a substantial phosphor bronze bearing. The big ends have plain phosphor bronze adjustable bearings of reasonable dimensions and amply provided with lubricating ducts.

The sparking plugs occupy vertical positions between the valves, and they are pocketed, so that no amount of over lubrication is found to affect their working. With regard to the valves, which are placed over the cylinders, standard practice has been adhered to, except as regards cooling. An air pocket extends under and around the valves as far as possible to ensure cool running, and the casting of the cylinders is a remarkably clean and complicated piece of work, there being no masses of metal to retain heat and cause distortion. Furthermore, the casting is so arranged as to afford a way of least resistance for the entrance and exit of the gases—this being a point to which the designer has paid special attention.

Minor Fittings and Accessories.

The adjustable tappets are provided with exceptionally long bearing surfaces, thus reducing wear and preventing the egress of oil. The neat lay-out of the engine, as regards magneto drive, timing mechanism, etc., should be noted, as also the insular position of the magneto.

Thoughtful design is exemplified throughout the machine—even to the arrangement of the tanks, which are shaped so that their top face will not collect water—being the result of practical riding.

Silencing is particularly effective, the square box silencer—an aluminium casting in the case of the solo mount—lying snugly under the crank case.

Thomson-Bennett magnetos and Amac carburetters are employed, and in these two models ground clearance has been considerably increased. In the 5 h.p. model a minimum clearance of 7in. is now obtained. The spring frame model has a clearance of 7½in. unmounted, and 7in. with a ten stone rider.

Hot Air Intake. Brazed Sidecar Lugs.

Both machines are fitted with efficient hot air intakes. The rear wheel brakes, heel operated on the left, are so designed that the rear wheel can be removed without dismantling the brakes.

The 5 h.p. model is equipped with a wide rear wheel mudguard, and this extra width of mudguard is to be adopted throughout in all models. Sturmey-Archer gear units, with light hand controlled clutch, are used.

In the 5 h.p. model very substantial provision is made for sidecar attachment. Two front couplings are provided, the lugs being integral with the steering head. The chain stay coupling is placed at a mechanically correct point—as near to the wheel axle as possible—the fourth point of attachment being, of course, directly under the saddle. The 3½ h.p. model, though not intended for sidecar work, is provided with a brazed steering head lug.

On the 5 h.p. model chain drive throughout is employed, the rear sprocket containing a large cushioning device. In the final model of the 3½ h.p. enclosed chain drive is to be used throughout; on the experimental model we examined transmission is by chain and belt.

On the 5 h.p. 650×65 mm. tyres are employed, and on the 3½ h.p. 26in.×2⅜in.

Road Test of Spring Frame.

The 5 h.p. model, though an accomplished fact, had not yet reached the stage of bearing registration numbers, and therefore we sallied forth for a practical road test on a standard 3½ h.p. Brough, which had seen considerable use, accompanied by Mr. Brough mounted

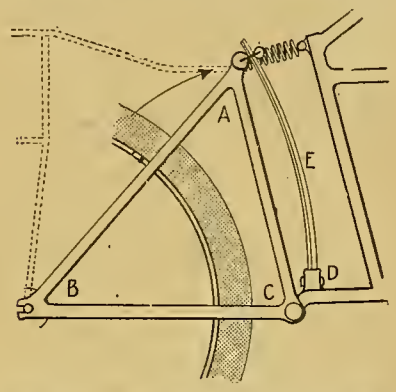


Diagram of the springing of the 3½ h.p. Brough.

on the spring frame model. Having thoroughly sampled the standard overhead valve model, and convinced ourselves as to its extraordinary powers of acceleration, speed, etc., we exchanged mounts, taking over the spring frame machine for a long ride over varying conditions of road.

The first point of significance on exchanging mounts was the convenience of the kick starter, and the comfort of being relieved, by the hand clutch, of the necessity for keeping up the revs. on corners. The new twin purred off the mark in a most delightful fashion, taking its top gear of 4.5 to 1 in a few paces.

The new side-by-side valve model in its present more or less experimental stage is nothing like so fast on hills as

A Brough tester demonstrating the efficiency of the spring frame fitted to the 3½ h.p. solo mount on the rough surface of Bulwell Forest.

A Spring Frame Flat Twin Brough.—the overhead valve model, though much was lost by the trickiness of the carburetter setting, but on the level there was little to choose, and very high speeds were attained over certain stretches. As regards general comfort, however, there was no comparison. We looked particularly for any peculiarity in the steering, owing to the frame springing, but the machine steered perfectly under all conditions, which would seem to indicate that the rigidity of the rear wheel is all that might be desired.

As regards the efficiency of the actual springing we can speak highly. The motion of the frame, without being embarrassing in extravagance of motion, was enough to damp out those constant small shocks and jars which become so tiring and irritating on a long ride. The machine rode with extreme comfort, while the springing added a general sense of satisfaction without in any way detracting from a feeling of perfect control and security.

Having encountered several stretches of pot-holes and wavy road surface, the machine was next ridden round a common, dotted with gorse bushes, board school football fields, etc., and here it became evident that the rear springing somewhat accentuated the crudeness of the front wheel springing. The rear part of the machine rode with perfect comfort, but the handle-bars seemed somewhat disposed to "come back and hit you." It therefore behoves the designer of this attractive machine to produce a system of front wheel springing as effective as, and in harmony with, his rear wheel system.

AN HISTORICAL EVENT.

How Motor Cyclists were the first to reach Dodoma in German East Africa.

By F. J. ASHLEY, Captain and Chaplain, S.A.M.C.C.

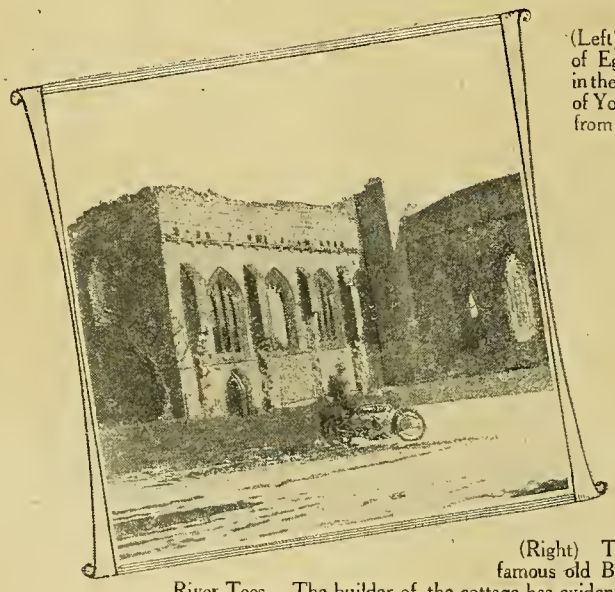
AMONG other periodicals we are always glad to see *The Motor Cycle*. Our feelings can be imagined then when we received the issue of November 16th, 1916, containing a letter from one Driver W. Miles-Thomas, of the M.M.G.S., in which he tells of the occupation of Dodoma by the armoured cars and the South African Motor Cyclists. In it he condescendingly recognises the existence of our Corps, referring to us as "rather a ragtime crush who can't ride for toffee." That sentence does us the service of allowing Mr. Miles-Thomas's views to be corrected and justice done to ourselves. I append what really happened, and which, but for his letter, we should not have repeated.

The armoured cars, escorted by the South African Motor Cyclists, left the infantry some nine or ten miles from the town, and advanced cautiously along the road for some six or seven miles, with a patrol of cyclists *in front* feeling for the enemy. Then the town came in sight, and part of the cyclists with the cars went on, while the remainder stayed with Gen. van Deventer in reserve, ready to move forward if any stubborn resistance were encountered. In front the cars moved slowly, so much so that Lts. Hall and MacHardy decided to go faster with their platoons, and eventually their keenness ran away with their discretion. They raced for the honour of being in first, and crossed the railway together, the former scouring the town while the latter himself hauled down the German flag, which had a white one above it. The cars turned up at least fifteen minutes after, when Capt. Goldberg, their commander, hoisted his own flag. One of the reasons for their slow progress was that the cyclists attached to them (and whose duty it is to ride before the cars to indicate to the drivers any inequalities in the ground) found difficulty on their Douglases in the sand, which the "ragtime crush" by this time had learned to treat with indifference. In fact, the B.S.A.'s took the duty of guiding the cars in.

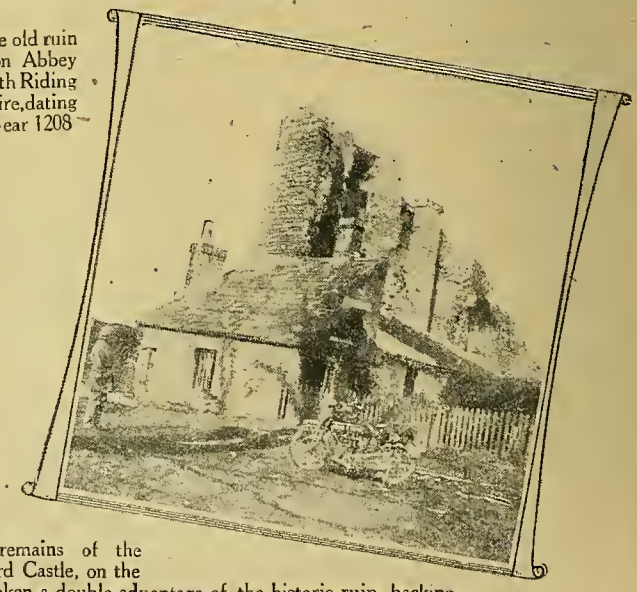
If Mr. Miles-Thomas wishes confirmation of this he can ask his Captain. Capt. Goldberg will also tell him this, that from Dodoma he asked for, and obtained, an escort of "the ragtime crush," which he kept until Kilossa was reached. We also rendered the following services to the cars. Coming to Kondoa we found one stuck in a drift with water and mud to its axles, and this car, which weighs over four tons, we, by stupendous efforts, pulled out. Further on the same car, I think, with its front axle badly bent, was overturned (through driving in the night) in a donga. This car we pulled out and set on its wheels, receiving the profuse thanks of its officer.

We saw a good deal of the officers and men of the armoured cars, and the greatest good feeling prevailed between us. We played football together, and fairplay was the dominant feature. Therefore, I have no doubt that Mr. Miles-Thomas's comrades appreciate the truth, and no doubt by this time have gently remonstrated with him over that phrase.

In any case it is only fair to the Corps to have this matter righted, and I shall be glad to see this published. The Corps has already covered two-thirds of the country from North to South, and is still going strong when other South African units have been all recalled, so there is something more than "ragtime" about them.



(Left) The old ruin of Egliston Abbey in the North Riding of Yorkshire, dating from the year 1208



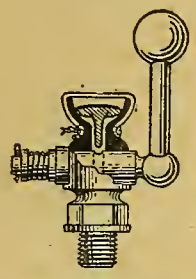
(Right) The remains of the famous old Barnard Castle, on the River Tees. The builder of the cottage has evidently taken a double advantage of the historic ruin, backing his house to the walls and using the stone as building material.

IDEAS: Useful and Ingenious.

Readers of "The Motor Cycle" are invited to contribute to this page any ideas successfully adapted to their motor cycles. Rough sketches will suffice.

AN IMPROVISED DECOMPRESSOR.

THE accompanying diagram shows a little device which is used on a 3½ h.p B.S.A. as a decompressor. It consists merely of a metal collar stud of suitable size and shape with the head cut off. This is dropped shank downwards into the top of the compression tap, and if the stud is a suitable one it will not allow any air to be sucked into the engine, but will lift on the compression stroke. A piece of wire bound over the top of the compression tap will keep the stud from lifting right out. This device certainly makes an enormous improvement in the ease of starting the machine, and will also enable it to run slower in traffic.—E. J. E. HUBBARD, Sevenoaks



A simple decompressor.

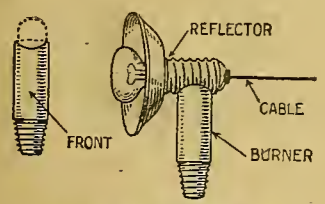
CONVERTING THE GAS LAMP.

NOW that carbide is becoming increasingly difficult to obtain, motor cyclists may be glad to know of a simple method of altering their gas lamps so that electric lighting can be used.

The materials required for each lamp are a reflector from an ordinary electric flash lamp and an old gas burner (if an old acetylene burner is not available a coal gas burner answers the purpose equally well, and can be purchased for a penny).

The fireclay is first removed from the burner, which is then screwed into the lamp, and a mark made on the front of it.

The top of the burner is next filed to receive the reflector, and the two soldered firmly together. The adapter is now complete and can be screwed into the lamp in place of the existing gas burner.



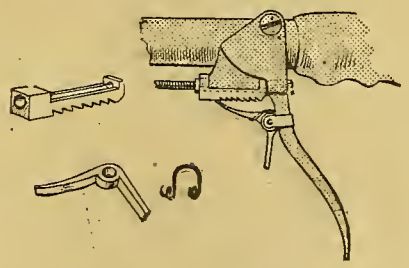
Utilising an acetylene head lamp for electric light.

One end of a piece of thin rubber-covered flexible cable is then soldered on to the "pip" at the back of an ordinary four volt screw cap lamp, and the other end is passed through the adapter and one of the ventilation holes in the lamp to the switch terminal. The bulb is then screwed home.

The adapters and the gas burners being quickly interchangeable, the lamps can at any time be used either as gas or electric. The gas tubing need not necessarily be removed.—E. C. CHAMBERLAIN.

FITTING A RATCHET TO A BRAKE LEVER.

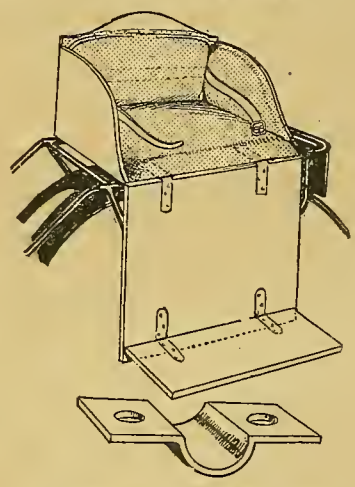
THE use of the front brake is practically *nil* for the majority of motor cyclists. It is only needed in emergencies or exceptional circumstances, such as descending a long steep hill, when it may be used as a relief to the foot brake, or in event of a temporary derangement of the foot brake. It is not a pleasant job at any time; the lever grip required is very tiring. The device shown here is intended to prevent this discomfort, and allows the brake to be fixed on as long as needed. It consists of a piece of steel drilled lengthwise for the passage of the Bowden cable, cut out to fit the existing lever stop, and ratchet teeth cut on the underside. The trigger is a piece of steel, annealed for ease in working, bent to a right angle, flattened at the centre, and drilled for pivoting; one end is filed up sharp to engage with the ratchet teeth, and, finally, it must be tempered. A small metal clip is fitted round the brake lever, fixed with a pivot pin, and a small spring fixed to prevent slipping. This may be a useful addition to the valve lift lever on some machines, particularly in a district where long downhill runs are frequent, such as North Wales or the Lake District.—M. DOUGLASS.



A ratchet fitted to a brake lever to relieve strain of gripping the lever on long declines.

A CHILD'S PILLION SEAT.

A PILLION seat is safer for a child than a strapped-on cushion. This can be made of ⅞in. whitewood or deal and 4in. iron brackets let in flush. The depth of seat to footboard must be suited to the length of the child's legs, and a strap screwed to the back. When rubbed well down and painted to match the colour of the sidecar, it looks really well.—G. LOOSLEY, Tooting

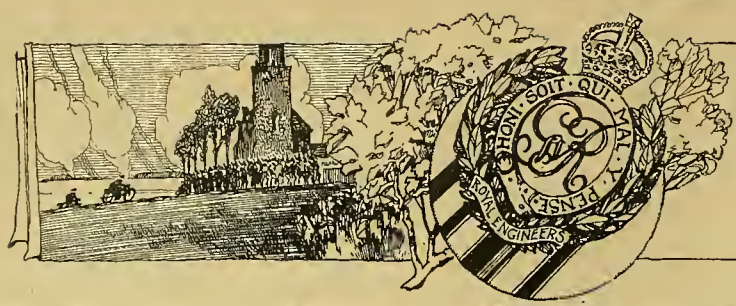


A pillion seat designed for a child.

TYRES AND ECONOMY.

A PATCH cut from a piece of ordinary cycle inner tube and stuck in the usual way over a cut in the front cover of a motor cycle will last many hundreds of miles before needing renewal, and is most effective in keeping out all traces of wet and mud. It is advisable to solution a piece of prepared canvas to the inside of the cover to strengthen the weak spot. If one of the specially made backed patches of a suitable size is available the job is simplified.

A cover which I intended scrapping in the autumn was repaired in this manner, and is still doing useful service on the front wheel of my Triumph, though the machine has been used regularly in all weathers during the past winter and usually with sidecar attached.—E.C.C.



MILITARY NOTES.

THE MUDGUARDING QUESTION AGAIN.

THE plea for better mudguarding is constantly being reiterated by motor cyclists at the Front, and Sec.-Lt. O. M. Neale is one of the many who write from France bewailing inefficient mud protection. He says: "During the past twelve months I have been riding a late 1915 three-speed Triumph, and I must say that this cycle is the most serviceable for this country. All motor cyclists are awaiting a new type of mudguarding. I am sure that if the manufacturers would give this matter close attention something could be done to relieve the muddy life of riders out here, and it would receive our everlasting thanks."

SIDECARRING NEAR THE EQUATOR.

CRITICISM is often levelled at the cooling of motor cycle engines; but it would seem that if an air-cooled engine can be run successfully in a country near the line of the Equator the added complications of water-cooling should not be necessary in this temperate climate. An officer quartered in Uganda, Tropical Africa, has written in praise of his Rover sidecar (which is illustrated) in the following terms:

"Since September, 1914, I have been riding a 1913 Rover sidecar combination, and I doubt if you could find another machine which has been subjected to so much hard wear and tear during the past two and a quarter years. Altogether it has covered over 15,000 miles over some of the worst roads and tracks it is possible to imagine, and beyond occasional overheating, necessitating a new valve, the engine has given no trouble."

MOTOR CYCLISTS IN MESOPOTAMIA.

WRITING from Mesopotamia, under date March 17th, 1917, Sergt. L. A. Bees, the L.M.C. rider, now with the Motor Machine Gun Service, says:

"I have just received three copies of *The Motor Cycle*, for which accept the thanks of the whole Battery, who had not seen a copy since leaving India last December. Although the majority had their first motor cycling experience at Bisley they are to a man very keen on the sport. The scouts are expert riders now, and are not to be beaten for rough riding. The little Douglases are standing up to the strain very well.

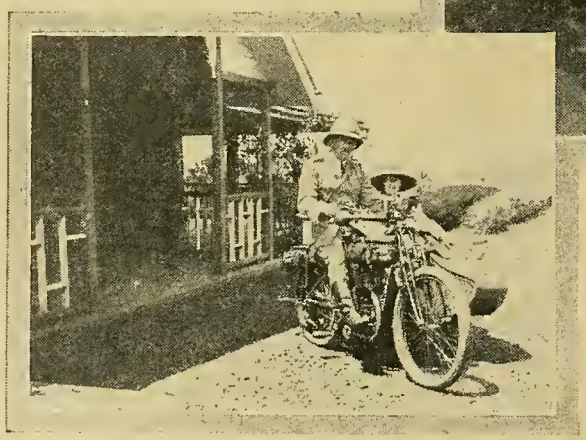
"The 'roads' are simply tracks made by mule carts, and go over tilled land, deep sand, stretches of desert thick with scrub, across waterways (dry) about two feet across and eighteen inches deep, the big dry canals, which have a gradient of one in three and are eight to ten feet deep. There is also another kind of road, which for some unknown reason forms itself into little waves—so ~~~~. This is the worst kind we strike, and means low gear for miles, with one's weight on the footrests.

"After nearly 3,000 miles of the above, with a stud of seventeen motor cycles, we have not had one breakage or stoppage (except sooted plugs and stuck rocker arms). I should say serious breakages or stoppages, as we were pulled up once, and I will tell you about the weaknesses this gruelling has found out.

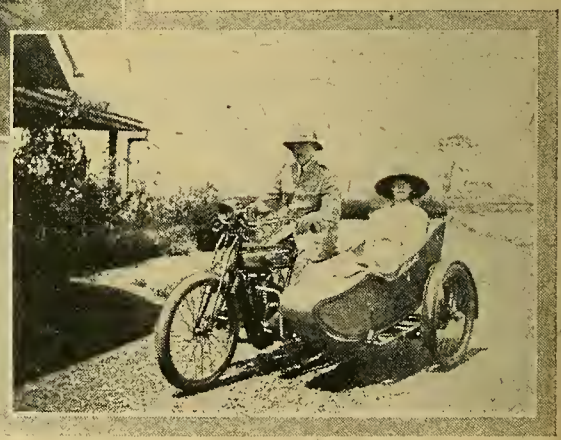
"When it rains here the surface turns into a tacky mud, and it is impossible to ride half a mile without clogging the mudguards. The mud is so tenacious that it acts as a brake and stops the engine. (We removed all mudguards after our first experience. I notice all D.R.'s here have done likewise.)

"Another rather serious trouble is that the fork springs break and stretch under the strain. I have overcome this by adding another spring (thus making three) from the point where the front brake cable goes through the forks to a bracket fixed on to the lug cast on the crown head. (Is the crown head lug put there for this purpose?) This makes quite a strong springing arrangement, which stands up well to its work, and very few people require a front brake. Apart from these two points, I have nothing but praise for the Douglas motor cycles, which are still running well and doing excellent work.

"We still have Ford transports with the Battery. They are standing up well



MOTOR CYCLING SCENES IN UGANDA.



Though his machine has been used quite close to the Equator, the owner of the 3½ h.p. Rover sidecar outfit reports that he has not been troubled to any great extent with overheating.

and carrying heavy loads. (Why not an English cycle car on the same lines?)

"The armoured cars are Rolls-Royce, and according to a captured Turkish officer are the only things they fear. The Staff is very pleased with the work they have done, and I may say that the captain, a sergeant, and a driver have been recommended for honours."

Sec.-Lt. B. Alan Hill, R.F.C., formerly a leading T.T. and competition rider, and until lately on the staff of *The Motor Cycle*, has been appointed in charge of the motor cycle repair shop at South Farnborough.

D.R. OF TRANSPORT SECTION.

LANCE-CORPL. D. DALBY (M.T.) writes: "I am enclosing you a photograph which I think may interest you. As you will see, I am riding a countershaft Triumph, and it has done twelve months' beautiful running on the worst of roads. The only repairs I have done to it are to fit a new exhaust valve and one kick starter spring. I have in my charge three more Triumphs, and they are all doing good work out here."

L.-Cpl. D. Dalby, M.T., mounted on his 4 h.p. countershaft Triumph.

It will be noticed that Dalby's machine has disc wheels. We would like to have heard his impressions of discs for work on muddy roads and particularly in strong wind.

THE BOCHE TANKS.

IF we are to believe an American correspondent, the Germans have used armoured cars on the Roumanian front both armoured and armed in a different manner from the British Tanks. Theirs is a lighter and faster war machine, about 24ft. long, having solid rubber tyred wheels about a foot wide on the tread. The crew is composed of ten men—one officer, two drivers, and seven gunners, either artillery gunners or machine gun men. The motive power is a petrol engine of 100 h.p., and the car has attained a speed of nearly twenty-five miles an hour. The car is closed completely, and the drivers steer with the aid of a periscope.

A FLAT TWIN ADVOCATE.

IN a letter from German East Africa, Driver W. Miles-Thomas, one of the M.M.G.S., L.A.M.B.'s—which, being interpreted, means Motor Machine Gun Service, Light Armoured Motor Battery—writing under date of February 19th, and referring particularly to the flat twin controversy and Mr. de Lissa's letter to Mr. Bradshaw, says:

"When Mr. de Lissa chortles about the A.B.C. 'hot side' someone ought to ask him why he had to invent his special exhaust valve for M.A.G.'s. Flat twins are in favour out here. No matter what kind of spring frame is used, a single or V twin will never be as comfortable or luxurious as a flat twin; either on paper or in actuality there is always an unbalanced force most noticeable at a critical speed. Carburation and silencing are made easier by the regular impulses of the two cylinders."

Then he repeats an impression once fairly general, but which we thought by now had been killed, that is, "that although small flat twins are practicable, the larger sizes are not a success. One has only to turn to the old Lanchester 10 h.p. horizontally opposed engine for proof of this."

(Personally, we consider this instance by no means proof, as the Lanchester flat twin engine is a design at least ten years old, and engine makers have learned a good deal in the interim.)

"But the flat twin is the engine of the future. Briefly, to my mind, singles are coarse, soulless, and inefficient, and the flat is the best both practically and theoretically for comfort and efficiency."

MOTOR CYCLING IN THE BALKANS.

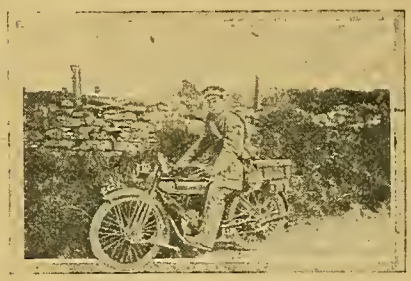
A DESPATCH rider with the Salonica Forces, in the course of an interesting letter briefly describing their work, mentions the terrible roads over which their motor cycles are used. He announces with glee that the military authorities are now making good roads, which will considerably improve the conditions. At the end of March—the time at which he wrote—the weather was just like a summer's day in England. The country in the neighbourhood of Salonica is mountainous, and the scenery is by no means despised. The writer compares the countryside to parts of North Wales.

YOUTHS FOR THE R.F.C.

YOUTHS of 15 to 17½ years of age, of "A" category, will now be accepted for special training in the Royal Flying Corps. Applicants must have passed Standard VI., and boys with some knowledge of engineering are preferred. The certificates required are: (1) Birth; (2) moral character from employer; (3) consent of guardian to the terms of enlistment, which will necessitate each boy, after attaining 18 years of age, serving four years with the Colours and four years in the reserve. Apply to recruiting officers.

A DESPATCH RIDER IN IRELAND.

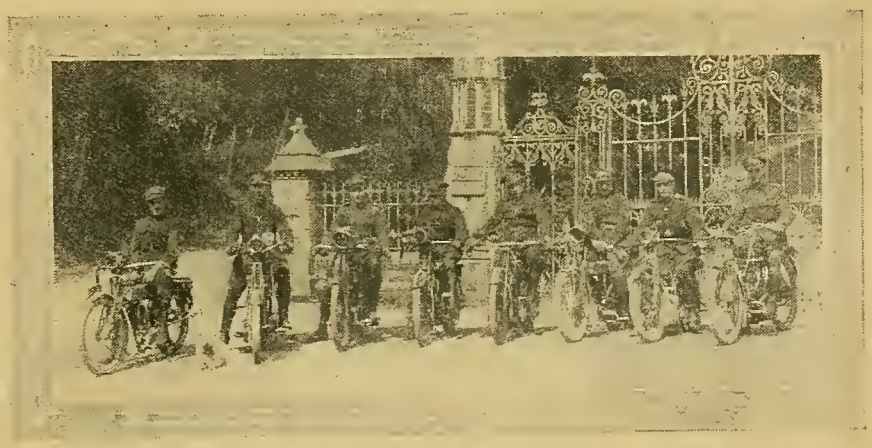
MOTOR cyclists are ever appreciative of the merits of their favourite mounts, despatch riders being no exception, and Cpl. G. C. Reid, who is stationed in Ireland, is one of many who have written in praise of the P. and M.



Cpl. G. C. Reid, R.E.

He says his machine is freely used as a knockabout hack, transporting everything from artificers' kit to parcels post.

Whilst Cpl. Reid was training in Scotland the machine constantly had stiff rises to face, and had many times to plough through seas of mud, but no real trouble was ever experienced.



Despatch riders attached to the Royal Engineers, M.C. Section. Reading from left to right: Cpl. Wamington (Triumph), L.-Cpl. Ellis (Enfield), Cpl. Sadler (Enfield), L.-Cpl. Oliver (Rover), L.-Cpl. Sanders (———), Sgt. Sankey (Triumph—note the artillery wheel), L.-Cpl. Cadel (Rudge), and Cpl. Smith (Indian).

TIMES TO LIGHT LAMPS.

SUMMER TIME.

May 17th	... ...	9.15 p.m.
,, 19th	... ...	9.17 ,,
,, 21st	... ...	9.20 ,,
,, 23rd	... ...	9.23 ,,

Novel "Substitution" Theft.

After a visit to a patient's house a New Cross, S.E., doctor found that his late model T Douglas had disappeared and a 1909 single-geared machine of the same make, with pedals, left in its place. A protest was lodged with the police as to this unfair exchange.

Eastern Lakeland.

Lakeland—what pictures rise in the imaginative brain at the mere mention of the word! Whether the lakes are in England, Scotland, Wales, or Ireland, they are all beautiful. English motor cyclists will, however, associate the word Lakeland with the waters of Cumberland and Westmorland, and if they are conversant with Eastern Lakeland they will revel in an article in the current issue of *The Light Car*, in which that exponent of the camera and the car, Mr. George D. Abraham, of Keswick, describes and illustrates a day's journey among the lofty moorland heights of that glorious country.

The Bradford Battalion National Motor Volunteers.

There is great rejoicing in the West Riding of Yorkshire since the Bradford Battalion of the National Motor Volunteers has just received official recognition.

Next Month's Volunteer Gathering.

We recently mentioned in *The Motor Cycle* that in June there was to be a combined assembly at Blackpool of North Country Motor Cycle Volunteer Corps. We are advised that the announcement has created considerable interest, and Mr. S. W. Phillpott, the instigator of the scheme, has received communications from all over the country, amongst other places from Bradford, Blackburn, Runcorn, Harlesden, Burnley, Workington, Bolton, and Preston, so that, with the Liverpool section, a good gathering is assured.

Mr. Phillpott has obtained the permission of his C.O. to go ahead with the scheme, and he has further passed it on to the county authorities.

The programme will not be finally settled until the strength of the gathering is known, but it will probably include a march or ride past along the extreme length of the Blackpool Promenade, with inspection by the County Commandant, or some high authority.

A SPORTING TRIO.

Mrs. Stevens Wood, of Wolverhampton, with Mrs. Stevens in the sidecar and Mrs. Wade on the carrier, covered part of the route taken by the Lancashire Motor Cycle Volunteers (illustrated on pages 424 and 425 last week). They were observed taking the hill between Llangollen and Ruthin, North Wales, in good style, on their 6 h.p. A.J.S.

SPECIAL FEATURES.

A SPRING FRAME FLAT TWIN.

DEVELOPMENTS IN THE RUDGE SIDECAR MODEL.

BRITISH FUEL AFTER THE WAR.

Stolen B.S.A.

Two more motor cycle thefts in the London district are reported—a B.S.A. and a James—both solo mounts. No wonder the police are busy looking after number plates, etc., and questioning drivers.

The Russian Royal Ruby.

Last week we described and illustrated a new design 8 h.p. Royal Ruby motor cycle for the Russian Army, and were able to commend several points of design. We are now advised by the Royal Ruby Cycle Co. that their designer is Mr. W. S. Caddick—the works manager—and the credit is mainly due to him.

Police and Number Plates.

In South London the police are very busy over obscured, etc., number plates. On the Dover Road at Blackheath last week a correspondent noted a motor cycle, a steam lorry, and a motor van lined up together whilst police entries were being made. All lettering should be touched up if necessary and damaged plates renewed.

Internal Cooling.

We have received several letters and sketches from readers setting forth their ideas with regard to the matter of internal cooling, and asking our advice *re* patenting them. Some of the ideas are quite good, but others are distinctly amateurish, the originators evidently losing sight of the fact that simplicity and lightness are essential.

A Hungry Dog.

A motor cyclist left his machine outside his house for a few minutes, when a dog attacked the front tyre and tore a piece out of the tread 6in. × 2in., and also bit another portion of the tyre. The insurance company refuses to meet the claim for damage, as one of the exclusions of the policy is "Damage to tyres unless the vehicle itself sustains damage."

Volunteer Motor Cyclists Wanted.

Motor cyclists are wanted for part time duties on work of national importance by the 4/23 Squadron City of London Motor Volunteer Corps (Motor Transport Volunteers). Petrol will be supplied free. Application should be made to Mr. A. Wright, organiser, Motor Cycle Section, 9, Shoe Lane, London, E.C.

Home-produced Fuel.

The possibilities of a British motor fuel after the war are discussed in an article in this issue.

Tyre Imports Stopped.

We are informed that the import of manufactured rubber goods, which includes tyres, has been prohibited. It is only surprising that this order was not carried out earlier in the war.

The National War Funds.

At the week-end the principal relief funds stood as follow:

The National Relief Fund (distributed £3,608,015)	£6,116,128	0	0
The British Red Cross Fund ..	6,581,686	4	11
Tobacco Fund	129,563	3	7

Petrol Restrictions on Cars for Hire.

The Petrol Control Committee has restricted the quantity of motor spirit allocated on the existing free-of-duty licences to motor cars bearing the hackney carriage plate. The new licences are as follow: 30 gallons per car per month when one car only is kept; 25 gallons per car per month when only two cars are kept; and 20 gallons per car per month when more than two cars are kept.

The Arbuthnot Trophy.

Lady Scott is exhibiting a replica of the Arbuthnot Trophy at an Exhibition of Medallic Art, Models for Commemorative War Medals and Memorial Tablets, held by Messrs. Waring and Gillow, Ltd., 180, Oxford Street, London, W.1. This was opened on Monday last by Queen Alexandra. It is curiously apt that the statuette should be exhibited during the present month, as the last day thereof is the anniversary of the occasion when the gallant *Defence* went to her doom, with the brave Admiral and the whole of his officers and crew.

Is this a "Win the War" Movement?

On Friday, the 11th inst., five able-bodied policemen were observed trapping motorists over a 220-yard length down the hill on the main road out of London opposite the Express Dairy Co.'s farm at Finchley.

On Saturday three men were seen "helping the war" in the same manner on the Golder's Green-Hendon road; and on Sunday another batch of men were doing work of National Importance in a similar capacity on the Edgware Road at the foot of Stanmore.

Motor Cycles not yet Recognised by U.S. Army.

In Milwaukee motor cycle riders played an important part in carrying out the Government orders to dismantle all wireless stations, amateur or otherwise. The city was divided up into sections, and motor cyclists sent out to scout for aerials, and in two days succeeded in rounding up the owners of all of them, and ordered them to report to Army Headquarters. It appears, however, that at the present time motor cyclists are not recognised in the U.S. Army. Four riders recently rode into Milwaukee—which, by the way, is the home of the Harley-Davidson—for the purpose of enlisting as motor cyclists, and were told that no provision was made in Army Regulations for recognising the motor cycle at the present time.

The War Women.

Female labour is not always the success it appears. A certain Midland agency and garage engaged a young lady assistant, but the connection was short, as the new acquisition persisted in turning up in breeches.

Flat Twins and Spring Frames.

These are the subject of leading comment in the motor cycling world to-day, and our description of the new Brough will be followed on all sides with keen interest. The speedy, overhead valve, rigid frame Brough will, of conrse, be retained as the standard model, the new spring frame mount will, it is supposed, prove to be a type which will appeal to quite a different class of rider. The 5 h.p. machine is designed purely for sidecar use.

Blackpool N.M.V.

Of the various towns in which the National Volunteer movement is in a healthy progressive state, Blackpool is undoubtedly among the foremost. Among its workers none has worked harder for the cause than Sgt. T. Sharples, who, we hear, will be pleased to have the names of any local motor cyclists who would care to enrol either as drilling or non-drilling members. Also he would like it to be known that in emergency cases the loan of motor cycles would be very welcome, several expert riders of the N.M.V. being without machines.

Sgt. T. Sharples, of the Blackpool National Motor Volunteers.

Recently Sgt. Sharples was the recipient of a silver medal for the useful and patriotic work he has accomplished in connection with the motor volunteers of that famous resort.

A Remunerative Football Match.

No less than £122 12s. was realised at the recent C.A.V. football match organised for the benefit of the St. Dunstan's Hostel. The match was played between a team from the C.A.V. works and the Davis Athletic Club.

The 'Bus Strike and Petrol.

There is this much about the motor 'bus strike in London—a considerable saving of petrol will be effected, and people will get a foretaste of what travelling conditions may be like in case petrol for 'buses *has* to be stopped.

No Clue to Missing Matchless.

There is no clue to Collier's missing Matchless, despite a £10 reward and the circulation of printed notices in the home camps. T. J. Ross, of the Woolwich Club, has, he told a correspondent, no news whatever of his stolen Harley-Davidson. Luckily it is insured to the full value, and the claim has been paid.

American Tariffs on Motor Cycles.

Whereas the tariff on motor cars imported into America is approximately 40%, the rate on motor cycles is "only" 25%.

Limitations of the Lightweight.

A correspondent voices his dishelief of certain claims that have been made concerning the climbing capabilities of lightweights. It is further surprising that the man who "averages" 45 m.p.h. on a $2\frac{3}{4}$ h.p. is usually a novice.

First Details of New Models.

In addition to the new spring frame Brough, we publish this week an exclusive illustrated description of the experimental model post-war 7-9 h.p. twin Rudge with three-speed countershaft gear and all-chain drive.

Shaft Drive.

If we have shaft drive on the rear spring motor cycle of to-morrow, we shall, apparently, be forced to adopt universal joints of the compact, metal-to-metal variety. This would appear, on the face of things, as a serious fly in the ointment, for universal joints are points of wear.

Unreliable Reports.

There is no truth in the statement which has appeared in the daily and technical press to the effect that the Petrol Control Committee has resigned. This denial was confirmed by the Secretary of the Petrol Control Committee at noon on Tuesday, the 15th inst.

Accommodation.

The problem of carrying sufficient kit and spares is one which perplexes most solo riders. There is no reason why the odd corners of a motor cycle should not be better utilised for the shoving-away of tool bags. This is a matter which rests not with the maker of accessories, hut with the makers of machines.

Addresses of Representatives Wanted.

The Acting British Consul-General at Turin (Mr. T. D. Dunlop) requests United Kingdom manufacturers who have branches, agents, or other representatives in Piedmont to forward to him the addresses of such representatives, as these will be of great assistance to him in dealing with enquiries from Italian merchants.

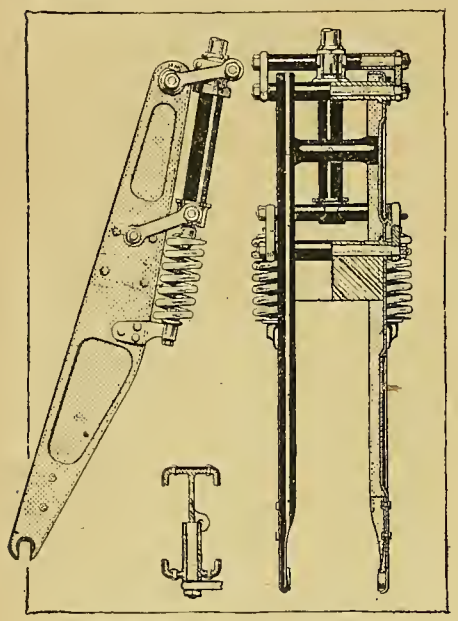
It is desirable that a copy of the letter addressed to the Consulate-General should be forwarded to the Department of Commercial Intelligence, 73, Basinghall St., London, E.C.2, for its information.

A May Day Forecast.

Many will recall our reference to an article in the May 1st issue of the *Daily Mail*—an article bearing the sub-heading "The Motorists' Farewell to the Road," and containing such observations as "This is a sad May Day for motorists . . . the new petrol restrictions came into operation to-day . . . petrol will henceforth be unobtainable . . . cars and motor cycles came out on Sunday for their last jaunt," etc. Now our worthy contemporary has wakened to a state of bewildered indignation on discovering that cars and motor cycles are still to be seen in the streets, and that the Petrol Control Committee has dared to renew certain licences.

SHEET METAL FORKS.

THE front forks of motor cycles are usually built up of steel tubes and malleable castings. This entails a considerable amount of accurate work in assembling and hard work in fitting. Mr. F. W. Barnes, of Zenith fame, has invented and patented a fork (No. 105,477) in which these disadvantages are overcome by the use of stamped sheet steel plates substantially of U section spaced apart by distance pieces. The plates take the form approximately of an isosceles triangle, of which the apex is



A pressed steel fork for which extreme simplicity of manufacture is claimed.

at the rear (here the springs may be fitted), and the base forms the forward edge. Each plate is thickened at the lower end, where a slot is formed to take the wheel spindle, and provision is made for a rim brake to be fitted within the side members.

Our readers will remember that we described a front fork of somewhat similar construction, the invention of Mr. W. Starley, of Birmingham, on February 17th, 1916. These pressed steel forks should be very strong and light, as well as cheap to manufacture.

BRITISH IMPORTS AND EXPORTS FOR APRIL.

THE Board of Trade returns for April reveal the fact that we imported thirty-two motor cycles during the month as against one in March. With parts and tyres, however, there was a decrease in value of £36,055 as against the March returns.

IMPORTS FOR APRIL.

	1915	1916	1917
Number of motor cycles	476	349	32
Value of motor cycles, parts, tyres, and accessories ..	£39,154	£32,089	£8,185

British Exports for April.

It is satisfactory to note that, in spite of the increasing difficulty of transporting goods abroad, the exports of motor cycles and parts kept to a fairly high level. There is an increase of forty-two in the number exported in April against the corresponding month of 1915, which, when one considers the U boat menace, is really good.

	1915	1916	1917
Number of motor cycles	942	626	984
Value of motor cycles, parts, tyres, and accessories ..	£71,372	£53,592	£72,824

Petrol Figures for April.

There was an increase in the importation of petrol of 1,012,405 gallons over the previous month.

NUMBER OF GALLONS IMPORTED IN APRIL.

1915	1916	1917
8,449,275	15,725,165	10,258,951

The number of gallons imported during the four complete months of this year was :

Jan., 1917	Feb., 1917	Mch., 1917	Apl., 1917
13,001,740	12,257,984	9,246,546	10,258,951

LOOKING AHEAD.

THE New Imperial Cycles, Ltd., have already fixed upon their after-the-war programme. There will be two models—the Light Tourist, fitted with a 2¾ h.p. engine with three-speed gear, clutch, and kick starter, and also with a two-speed gear minus clutch; the other mount will be the 6-8 h.p. twin sidecar model, on the lines of the machine supplied to the military authorities. This mount will have a three-speed countershaft gear, clutch, kick starter, and a shock absorber. The ground clearance at every point will not be less than 6in., which suggests that the machine will enjoy a world-wide sale.

AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the figures for the preceding five weeks. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.J.S.	1916	6 combination	—	£96
„	1914	6 combination	—	£56
„	1916	4 combination	—	£85
Allon	1916	2¾ 2-speed	£30	£33
„	1914	2¾ 2-speed	—	£28
Ariel	1915	3½ 3-speed	—	£44
„	1914	5-6 combination	—	£55
Bat	1914	6 3-speed	—	£48
Bradbury	1914	4 2-speed sidecar	£33	£43
Brough	1916	3½ 2-speed	£55	£57
„	1915	3½ 2-speed	—	£45
B.S.A.	1916	4½ sidecar	£57	£62
„	1915	4½ sidecar	—	£56
Calthorpe	1916	2½ 2-speed	—	£34
„	1915	2½ 2-speed	—	£24
„	1916	2½ 2-stroke	—	£28
Clyno	1915	2½ 2-stroke	—	£28
„	1914	6 combination	£65	£65
Douglas	1916	2¼ T.T.	£47	£49
„	1915	2¾ 2-speed	£45	£45
„	1914	2¾ 2-speed	£35	£35
Enfield	1916	6 combination	—	£78
„	1915	6 combination	£60	£62
„	1916	3 2-speed	—	£45
H.-Davidson	1916	7 combination	£65	£82
„	1915	7 combination	£68	£65
Henderson	1916	7 combination	—	£100
Humber	1915	6 combination	—	£65
Indian	1916	5 combination	£57	£62
„	1915	5 combination	£60	£56
„	1916	7-9 combination	£72	£88
„	1915	7-9 combination	—	£65
James	1916	4½ combination	£55	£67
„	1916	2-sp., 2-stroke	£33	£30
Levis	1916	2¼ Popular	£23	£24
„	1915	2¼ Popular	—	£21
Matchless	1915	7 combination	—	£74
New Hudson	1916	2-stroke, 2-speed	—	£28
„	1915	4 combination	—	£48
New Imper'l	1916	2½ 2-speed	£30	£28
„	1915	2½ 2-speed	£25	£22
Norton	1916	3½ 2-speed	—	£47
„	1915	3½ T.T.	—	£45
P. & M.	1915	3½ combination	—	£65
„	1914	3½ combination	—	£55
Premier	1915	2½ 3-speed	—	£28
„	1914	3½ 3-speed	—	£45
Rover	1916	3½ 3-speed	—	£49
Royal Ruby	1916	2¾ 2-stroke	—	£28
Rudge	1916	3½ Multi	—	£44
„	1915	3½ Multi	£35	£40
Scott	1916	3¾ combination	—	£60
Sunbeam	1916	8 combination	—	£110
„	1916	3½ solo	—	£72
„	1915	3½ combination	£80	£77
Triumph	1916	2-speed, 2-stroke	£39	£39
„	1915	4 countershaft	—	£53
Zenith	1915	8 Gradua	—	£62

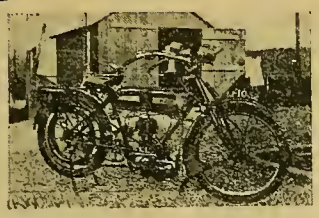
"Hints and Tips for Motor Cyclists."

A New Edition of a Useful and Popular Handbook.

THE popularity of that extremely useful little volume, "Hints and Tips for Motor Cyclists," has grown apace of late, another edition being required to meet the demand for it. This—the sixth edition—has been revised and brought up to date, and in addition a new feature has been incorporated. Previous issues contained simply hundreds of useful hints without illustrations, but in the one now on sale, key drawings showing the action of two and four-stroke engines have been included. It would be impossible to produce diagrams which could be more easily read and comprehended. In addition to the hints and various tips, there is an informative article which fully describes the working of the two-stroke engine, and the grouped paragraphs relating to the various idiosyncrasies of that perverse but attractive engine should be of inestimable value to any owner of a two-stroke motor cycle.

All the hints are numbered, and a complete alphabetical index enables a motor cyclist to find those appertaining to any particular part of the machine with which he may experience trouble, or relating to such items as choice of a machine and accessories, insurance, driving, etc.

Not only to the experienced rider, but also to those already in the Services, and to the many who are entering one of the many motor cycle branches, the little volume will specially appeal. It is obtainable from bookstalls or may be had direct from the publishers, Messrs. Iliffe and Sons Ltd., 20, Tudor Street, London, E.C.4, in stiff cloth bound covers 1s. 8d. post free.

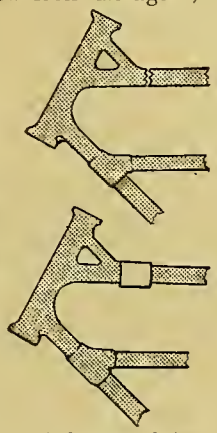


Three Years' Motor Cycling.

An Irish Motor Cyclist's Experiences and Details of Running Costs of a B.S.A. Motor Cycle.

IT was on a May morning that I made up my mind to buy a motor cycle. I remember that day well, and it is a day that I have never regretted. Many an enjoyable ride have I had since that May morning.

I did not know much about motors at this time, but I purchased a B.S.A. almost new from an agent, who guaranteed it to be in good condition, and promised to keep it in order for me for three months if anything went wrong. Since then my knowledge of motoring has considerably increased. The same cycle is still in my possession, and seems to be as good as on the day I bought it, and, what is still more, it has never had to be in the repair shop except once, all the adjustments being so slight that I could quite easily do them myself at home.



A fracture of the top tube was repaired in the manner shown in sketch, a piece of metal being bent round the top tube over the crack, and the ends brazed together. In these days when many makers cannot undertake outside work, such a successful repair was fortunate.

The first long ride that I took was to Downpatrick for my licence. This was a distance of about fifty miles there and back. The petrol consumption worked out at about sixty miles to the gallon only. However, I soon found out that the jet was much too large. One advantage of the B.S.A. is that the jet can be adjusted from the saddle. When I purchased the machine it was open one and a half turns, and this accounted for the low mileage.

Round the Antrim Coast.

My second long ride proved much more satisfactory as far as consumption of petrol was concerned. My cousin and I set out from Bangor to Down, both mounted on B.S.A.'s. The day was fairly good, but showery. We rode round the Antrim coast as far as Portrush, a distance of 100 miles. My cousin's cycle then took exactly one gallon of petrol, but mine overflowed when one gallon was being poured into it. This was extremely good, over 100 miles to the gallon, but, of course, on short journeys this mileage would not be obtained.

Coming home we took the inland way, that is, by Ballymena. This road is well adapted for speed. It is also smooth, and in some parts you can see for miles ahead, and we touched 40 m.p.h. for miles at a stretch. On another occasion we visited Portstewart. The morning was fine, but coming home we had rain the whole way, a distance of seventy miles.

A Dunlop R.S. (26 × 2¼) tyre ran on the back wheel for 3,882 miles; it was then changed to the front wheel, where it still is after having done a further 2,242 miles (6,124 miles in all), and still in good condition. A Dunlop 1in. belt has done over 5,000 miles and is still on the machine.

When I bought a sidecar I fitted a Philipson pulley, which, I find, acts well. The machine, although only 3½ h.p., takes the sidecar over any ordinary hills fairly satisfactorily. The sidecar is very light, being a Millford Pinnace model. The low gear on the pulley is about 8 to 1.

The only breakage of any consequence was the top tube of the frame. Some of the roads are exceptionally bad, and I attribute the breakage to this.

The costs given below include such items as spares, extras, clothing, licences, etc.:

	1914.	1915.	1916.
Mileage	2,687 miles.	3,117 miles.	1,707 miles.
Total Cost	£11 17 5	£17 7 5	£20 19 10*
Cost per Mile	1.06d.	1.3d.	1.2d.

* Year 1916. Sidecar cost £12 10s. Therefore, net cost is only £8 9s. 10d.

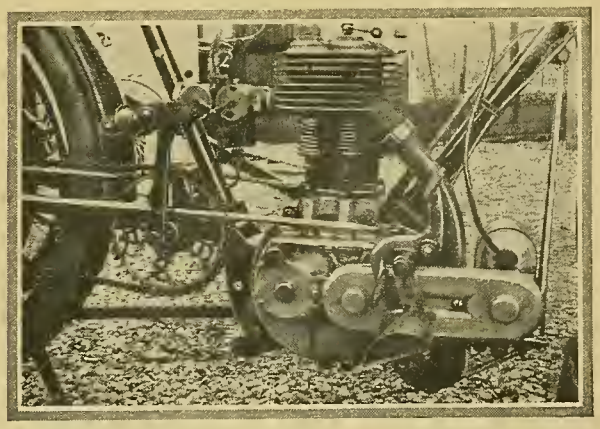
PETROL MILEAGE.

	1914.	1915.	1916.
Petrol used	36½ gals.	33½ gals.	22 gals.
Miles per Gallon	73.6	93.0	77.5 (Sidecar)

With regard to oil I get a little over a thousand miles to the gallon.

If spares such as valves, soldering lamp, vice, and speedometer, were not included in the above expenses, then the cost would work out at about one penny per mile. May the time soon come when we shall be once more in a land of peace and be able to indulge freely in this interesting and health-giving pastime.

W. FERGUSON.



The power unit of the 1913 B.S.A. motor cycle which ran consistently well for 10,000 miles.

NEXT WEEK'S ISSUE.

An Outline of the Special Contents of Next Week's Number, issued on the eve of the Whitsuntide Holidays.

THE next issue of *The Motor Cycle*, dated the 24th inst., is the one preceding the Whitsuntide holidays. In days of peace a special number might have been issued, but war time is not propitious for "specials." However, a number of features of absorbing interest on a variety of subjects have been prepared for this issue. Firstly, by permission of the War Office an article is to be included dealing with "The Work and Training of a Despatch Rider," which will be illustrated by a number of striking photographs. This article has been written by the Editor of *The Motor Cycle* for simultaneous publication in an American contemporary, in order to aid our American Allies in the training of brothers of the wheel across the Atlantic.

Another article written by an R.E. Officer now on Active Service is entitled "*Angleterre—après la Somme.*" It describes how two officers home on leave, lured by the call of the road, converted a five-year-old single-cylinder machine into a (somewhat precarious) sidecar outfit.

Five Pounds for a Wrinkle.

Speed men will be particularly interested in an article divulging "a £5 tip," which is descriptive of a method of so altering a magneto that the utmost speed can be obtained. The secret was sold by a French mechanic some time ago to a party of British hill-climbing experts, and an extra 5 m.p.h. was guaranteed.

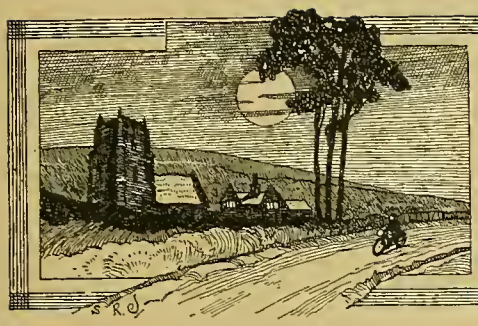
The above articles are in addition to our regular features, among which it is possible now to include our Military Notes Section, *The Motor Cycle* having long been regarded as the Journal of the Services.

LANCASHIRE MOTOR VOLUNTEERS' ROUTE TEST.

The motor cycle section of the 5th Lancashire Motor Volunteer Light Car Battalion about to start for a route test and ambulance drill. They are shown at Woodside Ferry (Liverpool) on Sunday last, under command of Adj. J. W. Davies.

Motor Cyclist Volunteers' Riding Test.

INCIDENTS of the all-day scheme held on the 6th inst. by the Heavy Car Battalion of the Motor Volunteers, Liverpool, and illustrated in our issue of May 10th, serve to show that the men possess some capability as motor cyclists, and can be depended upon for trustworthy work. The secret route lay over the steep and rough mountain roads of North Wales, Mr. S. W. Phillpott, the officer commanding, being responsible for the whole outlay of the scheme—his object evidently being to test the capabilities of his men in negotiating difficult roads. The route lay from Birkenhead to Llangollen, *via* Caergwrle, Hope Mountain, and the famous Horse Shoe Pass, the return being made up the Pass of Ruthin, and thence *via* Mold and Queen's Ferry. On the little-used mountain by-roads between Caergwrle and Rhydtalog a smart piece of repair work was carried out by Cpl. Mainey and Sgt. Williams. A sprocket of the corporal's machine came adrift and the key was lost. A new key was made out of a piece of a spanner, and this saw Mainey through the day. The scheme was laid out as follows: "Motor cyclists are required at Headquarters (Llangollen), and, the country being partially in the hands of the enemy, four separate squads are ordered from Liverpool. The main roads in certain places are known to be covered by the enemy, so unused roads must be utilised. The first squad leaves Birkenhead ten minutes after landing, the remaining squads at five-minute intervals. At Llangollen it is learnt that headquarters are removed to Ruthin. Arriving at Ruthin it is found that headquarters have removed to Queen's Ferry Bridge, and squads are ordered to proceed *via* Mold." Good time was kept throughout, and marks were awarded for performance on the road, reliability, and for smartness in infantry drill.



BRITISH FUEL AFTER THE WAR.

SOME EXPERIMENTS WITH SOLVENT NAPHTHA AND A MIXED FUEL.

IT is highly desirable that British motorists should be independent of foreign fuel, and after the war there will probably be a large quantity of benzole and toluol on the market for which a use will have to be found, otherwise the benzole recovery plants, a large number of which have been erected at the instigation of the Ministry of Munitions, will have to be closed down, which would be a very great mistake.

Pure benzole will, of course, always find a ready buyer in the initiated motorist who in pre-war days found it an efficient motor fuel. It will also be in demand for the manufacture of dyes, of which Germany formerly had the monopoly.

Petrol is not only difficult to obtain, but it is very expensive, and it is by no means desirable that the British motorist should be in the hands of a petrol combine, as was the case before the war, if such a contingency can be avoided by the introduction of a British fuel.

A difficulty is to be expected, however, in the sale of toluol, and of the still higher boiling point compound solvent naphtha, another product obtained where benzole and toluol are manufactured for munition requirements. It is obtained always at the end of a distillation of crude 65% benzole. Solvent naphtha is composed chiefly of ortho, meta, and para xylols, pure compounds which have a boiling point of 138° C. It has a specific gravity of 0.871 at 60° Fahr., and when distilled 90% of its bulk is volatilised at a temperature of 160° C. Its flash point is 78° Fahr. It is used in rubber works as a solvent, and also finds use as a burning oil. I have used solvent naphtha on my 2¾ h.p. A.J.S. with entire success. Easy starting can be obtained in summer, but an injection of a more volatile fuel is necessary in winter. After placing fine mesh wire gauze over my A.M.A.C. jet and using a No. 26 jet, the oil in the crank case showed no trace of solvent naphtha upon analysis. I believe the size of the jet needed reducing owing to the fact that solvent naphtha gives 60 c. ft. of gas per gallon against 40 c. ft. with benzole. The amount of gas given per gallon of fuel is, in my opinion, an important factor in choosing the size of a jet. I am acquainted with two firms who have sold solvent naphtha as a petrol substitute with entire satisfaction to their customers, and there is no reason why it should not be more widely known and used than it is at present.

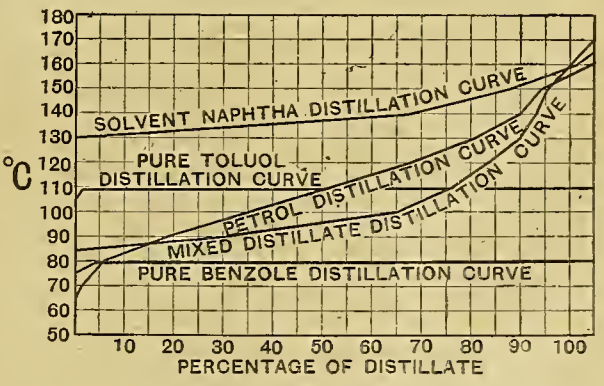
Now relying on the fact that solvent naphtha alone can be successfully used as a motor fuel, I have made experiments as to the suitability for an internal combustion engine fuel of the total distillate in the rectification of crude 65% benzole.

Starting with this latter compound, I obtained as finished products 48% benzole, 13% toluol, and 8% solvent naphtha.

So far as I know, the idea of mixing the whole distillate is quite new, and it proved entirely successful. No adjustment to the carburetter was required, except a reduction in the size of the jet, and the carbon deposit was by no means excessive; in fact, the ordinary motorist would perceive no difference between the mixed fuel and pure benzole. The smell, however, is more pungent owing to the presence of solvent naphtha. These products, when mixed, gave upon analysis the following results: Flash point, approximately 50° F. (below normal temperature); specific gravity at 60° F., 0.882.

The distillation curve will be found in the graph, together with those of pure benzole, pure toluol, solvent naphtha, and petrol.

It will be readily seen from this analysis that the mixed distillate compares very favourably with petrol, though in cold weather starting would be more difficult. To produce it from crude benzole would require less labour than at present used in the separating of the various fractions, and one ton of coal should produce on an average 1.3 gallon of mixed fuel on distillation into gas and coke. It is to be hoped that manufacturers of benzole, etc., will keep their plants working after the war, and give us a home-produced fuel almost equal to petrol. If they do this they will find ready purchasers for their output at a fair price. Naturally definite information cannot be given at present of the amount of benzole or mixed fuel which will be available, but it will unquestionably be far in excess of the pre-war supply. R.M.



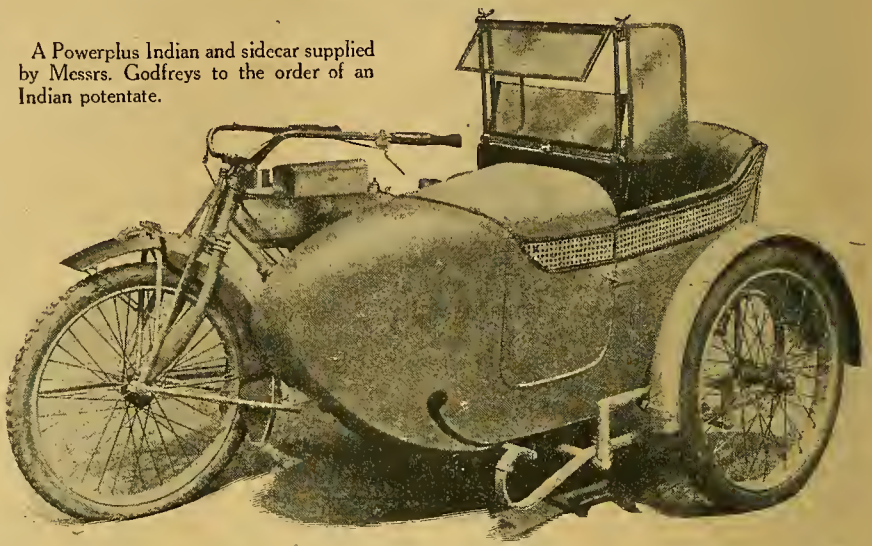
Graph showing the distillation curves of various fuels.

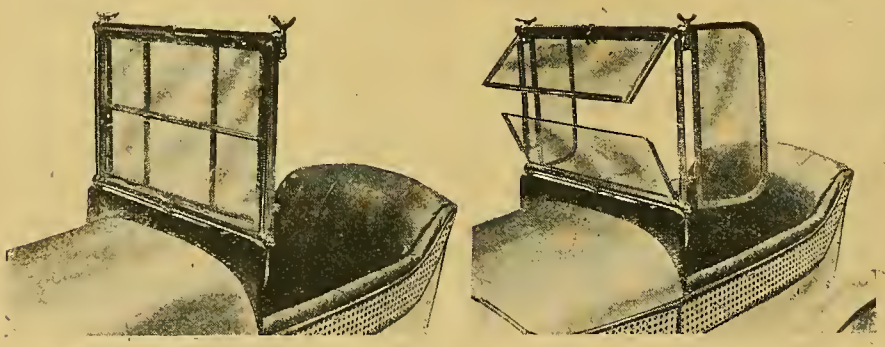
A LUXURIOUS COMBINATION.

A Motor Cycle and Sidecar finished in Aluminium for an Indian Potentate.

THE increased popularity of the sidecar may be judged by the fact that one has recently been supplied by Messrs. Godfreys, Ltd., 208, Great Portland Street, London, W.1, to the order of an Indian potentate. The motor bicycle is aptly a handsome Powerplus Indian, and the whole combination is finished in aluminium. A standard sidecar frame is fitted, but the body is a special one supplied by Messrs. Godfreys. Attached to the hinged scuttle is a windscreen fixed on a polished board; the windows are of plate glass and the frame is plated metal. It is most elaborate and very attractive in appearance. To protect the passenger from side draught there are wings at the sides, while the double central window permits of a variety of adjustments

A Powerplus Indian and sidecar supplied by Messrs. Godfreys to the order of an Indian potentate.





This adjustable windscreen is attached to a hinged scuttle, the windows being of plate glass and the frame plated metal.

One of the advantages of ample power is that it enables the employment of these various refinements, certainly desirable in an overseas machine, without detracting perceptibly from the speed of the outfit—the additional weight and increased wind resistance being of little consequence with such a machine as the Powerplus Indian. We should imagine, however, that the windscreen would be better named a "dustscreen" for India's tropical clime, where surely the draught created by the passage of the machine would be welcome.

DECARBONISING.

"Leave Well Alone" when it concerns Piston Rings.

IT is the practice of most riders, when decarbonising their engines, to aim at removing every particle of carbon deposit not only from the cylinder head, but also from the sides of the piston, the piston grooves, etc. Whether or not this practice is right, it is one which the writer never adopts. Clean the cylinder, the piston head, exhaust, etc., by all means, but personally I fail to see that there is anything to be gained by scraping out the piston ring grooves, or by removing traces of carbon from those portions of the piston in contact with the cylinder bore.

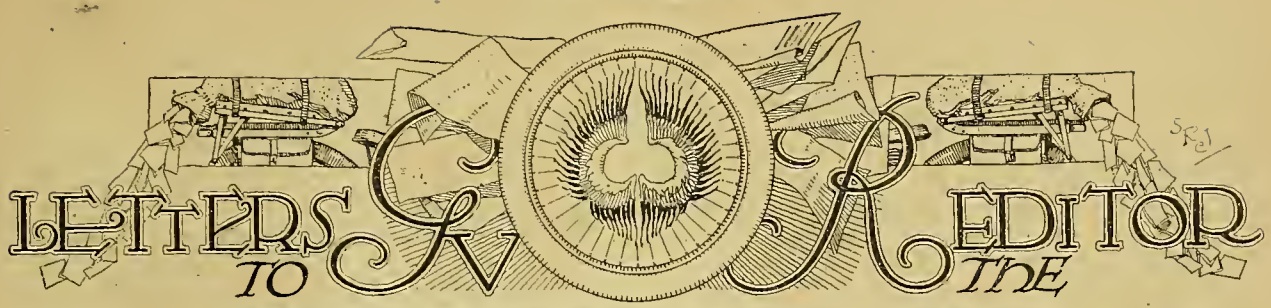
If one of the piston rings is gummed up it is, of course, necessary to remove it and replace it cleaned and polished into the carefully scoured groove, but if the rings are free and functioning properly it is by far the best plan to leave them alone.

The carbon deposit forms only on surfaces which are not in contact with other surfaces—that is, it has, by a natural accumulation, filled up the empty nooks and spaces, and probably its presence there is largely due to the escape of hot gases. By filling up these empty spaces it makes up for deficiencies in fit, and its presence must prevent the escape of useful pressure at those points where there is no metallic contact to prevent it. Moreover, this carbon deposit is well saturated with oil, and acts as an oil retainer.

A new broom never sweeps clean—neither does a new piston. Take, for example, the Scott engine, the piston rings of which very seldom gum in their grooves, owing, probably, to the water cooling. The pulling powers of this particular engine are entirely spoilt if the carbon deposit be scraped from the piston grooves, and it takes another 500 miles to restore the engine to its original tune.

Mr. Alfred Scott is entirely in agreement, and I have on many occasions been able to satisfy myself that in the case of four-stroke engines also far better tune is maintained if the piston rings are left severely alone—always with the proviso that they are not gummed solid.

CHINOOK.



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address

"SOME" BICYCLE.

Sir,—Those people who talk of climbing hills like Sunrising on a single geared lightweight two-stroke must really have mistaken the hill. I claim to have had a fair experience of motor cycles, including that buzzing (and often noisy) two-stroke, but it would be absurd for me to claim an ascent of Sunrising on one, yet I have *tried*—many times, and friends have done likewise. Why do motor cyclists make assertions of impossible deeds of this kind? For my part I ride a four-stroke to-day.

Coventry. J.B.T.

DOES GALVANISING CAUSE BRITTLENESS?

Sir,—I note a minor point of contention between Mr. Hitchcock and "W.F.C." *re* brittleness being caused by galvanising.

This all depends on the method employed. In the hot process, in which the article after being immersed in the hot spelter is plunged into cold water, the metal is hardened and, therefore, brittleness is caused.

When, however, the electro-galvanising process is used, in which the zinc is deposited by electricity, the temper of the metal is unaffected. H. R. WHITEHEAD.

A SUGGESTION FOR FUTURE TAXATION.

Sir,—An ingenious suggestion has been made by a prominent member of the Birmingham Rotary Club in a recent address on "Multiple Taxation and a Suggestion for Simplification." As the motorist generally has had an extra burden of taxation to bear, this matter might interest your readers specially on that account.

Briefly, the principle of the idea is to have one impost only and to scrap all the other taxes which, besides confusing and being a nuisance in various ways, cost so much to collect.

It is suggested that it might be arranged on the system of stampage, charged so much in the £. Just as a discount is deducted when paying an account, so could the stamp tax be deducted. For example, if the tax, or stampage, is, say, 4d. in the £, one will be required to affix stamps to the value of 3s. 4d., and make out one's cheque for £9 16s. 8d. on a purchase amounting to £10. The receiver of the money would, for his legal receipt, cancel the stamps. As one pays the tax with the other man's money that would be all right, and when one has sold the tax would be borne by that one, so that each transaction would mean a contribution to the Revenue.

Now, how would this affect the motorist? In addition to getting rid of the unfair assessment of taxes and the numerous rates and duties, both municipal and national, he would pay according to his wealth, or at any rate according to the value of his purchase. What strikes us most is the lessening of the tax burden when the sale concerns a second-hand vehicle. Should not the amount the poorer man has to pay to the State on the purchase of a second-hand car or motor cycle be less than the rich man pays when he buys a new one? There is a big thought in this question, and, if it interests your readers, much more could be said in its favour, and a discussion would bring out its bad points, if there are any.

It would be interesting to have the views of others as to whether the tax should be based upon bore and stroke or upon weight of vehicle, or the extent a car is used, or whether it is not more fair to base it upon the value of the car irrespective of how much it is used.

ARTHUR BUTTERFIELD.

TANK MINOR.

Sir,—With reference to "East Coast's" article regarding the "Tank Minor" monocar, may I ask one or two questions? Does he intend to have the engine completely covered in—on top by the bonnet, and underneath by the under-shield? If so, why not introduce some auxiliary method of cooling, such as is used on Zeppelin engines?

When summing up the various controls, he does not say where he intends to place the change-speed lever. Would he use the ordinary Douglas lever and quadrant? If so, how would the connecting rods be arranged?

I take it that he intends to use band brakes throughout.

Highgate. CURIOSUS.

TWO-STROKE ENGINES IN CANADA.

Sir,—I have been reading *The Motor Cycle* for quite a while, and am very interested in the two-stroke motor cycle.

I bought a 6 h.p. Schickel two-stroke single-cylinder in 1913, and it was the most reliable motor cycle that I ever rode. I could use kerosene or any other substitute with good satisfaction, but I had to have petrol to start the motor. It was driven by a flat leather belt, gear ratio 5¼ to 1, and it had plenty of speed and power to go anywhere I wanted to go with a passenger on the luggage carrier. One good feature about the motor was that it had practically three moving parts only, and the gasolene was heated before it was forced into the cylinder. There was a pipe cast on the cylinder, which extended all around it, and the carburetter was screwed into this pipe, the gas being compressed in the crank case before it went to the cylinder, and petroil lubrication was employed. The tank was made of cast aluminium, and was part of the frame. The motor ran very quietly, I never had any trouble with overheating, and I have covered more than 200 miles a day with a 14 st. man on the luggage carrier. The roads we have in Alta, Canada, cannot be compared with the roads over here, and I am sure I wish I had brought it over here with me, too.

(PTE.) E. M. THOMPSON.

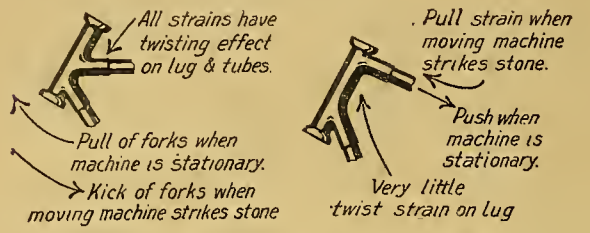
VOLUNTEER MOTOR CYCLISTS.

Sir,—I have been pleased to note the publicity you have been giving to the work of Volunteer Motor Cycle Sections. The rapid strides and excellent work being done by Liverpool, under Mr. Phillpott, tend to prove that they must be working on the right lines. I had the privilege last August of spending a little time with them in order to study their methods of training, etc. I have endeavoured to work on similar lines, with the corps to which I have the honour to belong. The sole reason of my time with Liverpool was that I felt that for motor cyclists to be of use if mobilised, and to be of any value to the car or van squadrons to which they are attached, they must have a separate specialised training qualifying them for the various duties that would fall to them to fulfil, whereas it appears to me that from not realising this point the majority of motor cyclists would be only a fraction of the use they might if under a specialised system of work and training.

Mr. Phillpott is an enthusiast, and as his system has received the approval of Maj.-Gen. McIntyre, I trust he will in the future give us further details of training, the success of which is also proved by the number of motor cyclists in his sections. The parade and inspection to be held at Blackpool, June 3rd, will be well attended, I trust, as it is bound to be a help to every section attending. A. E. BEARD.

FRAME DESIGN.

Sir,—"C.A.F.'s" letter in *The Motor Cycle* for May 3rd makes me glad to see that there are, at any rate, some who are dissatisfied with the conglomeration of bent tubes which form the motor cycle frame of to-day.


All strains have twisting effect on lug & tubes.
Pull of forks when machine is stationary.
Kick of forks when moving machine strikes stone
Pull strain when moving machine strikes stone.
Push when machine is stationary.
Very little twist strain on lug

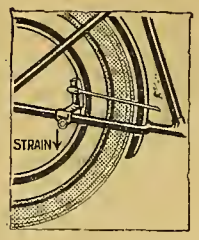
Design illustrating H. St. V. Addenbrooke's letter on frame structure.

He raises the point that the bent top tube is put in to obtain a low saddle position without loss of petrol-carrying capacity. I admit that this was the reason why the bent top tube came into existence, but it is certainly no reason why the bent top tube should continue to be fitted when we know of a better way—namely, making the tank wide and deep in front and tapering it down to the back and having a sloping (not bent) top tube.

The above sketch will make clear, I think, the strains imposed on each type of head lug and tubes.

A bent front down tube is, of course, a ridiculous and unnecessary way of weakening the frame, or of making it heavier if the bent tube is reinforced.

There are lots of frames on *single-cylinder* machines on the market that are bad enough, but the height of foolishness is attained on some flat twins, where not only is the frame badly designed, but is designed in such a way as to make rigid engine attachment impossible, which is *proved* by the fact that many flat-twin engines of a certain make pull themselves over in the frame, so that the driving sprockets are out of alignment with the gear box sprockets.



Illustrating strain on frame imposed by brake.

"C.A.F." says he would like to know all the strains imposed on each tube of a motor cycle. To give a complete list of these would be tedious, as the strains on each tube vary considerably in accordance with whether the machine is standing still, accelerating or stopping by means of the application of the brake.

And this brings me to another point. Just consider the strain imposed on the bottom backstay of a motor cycle fitted with the ordinary belt rim brake! Is this not food for thought?

H. ST. V. ADDENBROOKE.

LARGE FLAT TWINS.

Sir,—*Re* the new A.B.C. big engine at "aeroplane" weight, much as I admire this and Mr. Bradshaw's work, I do not see the point of covering the cylinder fins with copper. I know about the conductivity, but it makes an additional distance to convey the heat of cylinder, and unless incidentally you much increase the surface, the correction of heat is less, and not more, by coating the steel with copper. Perhaps it is not sufficiently explained, and the fins are copper on a steel cylinder, in which case I agree.

What I want is a back spring frame, as rough roads always pull me up, while cars can still "travel." I suggested to the makers that a back spring frame would be highly desirable, and got the reply that a cycle can be made comfortable by a well sprung saddle. But to anyone with a shade of mechanical sympathy, it is the engine that wants making comfortable more than the driver. Of course, you can take a heavy machine over rough roads at a fast pace, say over twenty-eight miles an hour (for this), with more comfort, but now and then you hit something very hard indeed, and anyhow I should not expect this treatment to result in the machine lasting very long. Personally, I drop to fifteen or so on really rough stuff.

CHAS. S. DYER.

SIMPLIFYING THE TWO-STROKE.

Sir,—Your correspondent "Chinook" touches the fringe of a very big problem for the manufacturer in his suggestion to employ integral units in large scale motor cycle construction, and, as far as he goes, I agree with him entirely.

Cheap, light, and efficient construction, generally involving radical improvement in design and the incorporation of pressed steel construction, is the basis of success; indeed, experience would, I think, place the use of pressed work at the very foundation of success. It accounts for the success of the cycle and of the cheapest car the world has ever seen, or is likely to see for a decade to come.

The trade knows perfectly well that the very biggest manufacturing businesses cannot be built up without all the advantages of a huge production as a means of keeping down the cost of the product and a means of meeting competition, but the capitalists to finance such ventures are shy because they know perfectly well that such schemes would tumble down like a pack of cards as soon as a cheaper and equally efficient design of product disturbed their monopoly.

But the manufacturer has not learned, or will not learn, the economic lesson that this state of affairs ought to teach him And that lesson is that the production of integral units offers a means whereby with a relatively small expenditure of capital he may obtain a grip on the market with far more certainty than by attempting to manufacture complete machines ready for the road.

It is not a fact, I venture to state, though it is commonly accepted, that the Ford success—at any rate of its early years—was due to the production of all the car parts in the firm's own works. It can scarcely be doubted that if that company had confined its production to that of the very cheaply made and sufficiently efficient engine commercial success would have been assured. To put it in another way, if the White and Poppe Co. of ten years ago had put their own British-made power unit on the market, and that that unit could have been as cheaply produced as the Ford engine, can there be any doubt but that an enormous business in power unit construction would have been built up? I think not To come to a more direct illustration for our purpose, let us take the Douglas engine, which has, I understand, a very fine reputation. If the whole energy of that merry looking gentleman in kilts had been devoted simply and solely to power unit production in its cheapest possible form, can it be doubted that his product would have compelled motor cycle makers to buy it? Everything depends on design and cheapness. Why do not the makers of ball bearings and cycle tubing use their whole product for their own cycle manufacture? Quite obviously because it pays better to have a large output of a standard article than to make and assemble a hundred different things, and to sell only the final product. There is no better reason for motor cycle engine makers to assemble all their own complete cycles than for the makers of magnetos, frames, car bodies, steel wheels, saddles, or lamps to do the same thing in motor cycle or car manufacture To my mind, the practice of most firms to-day in making engines only for their own use is an admission that their engine output is limited, and that their engines are neither better nor cheaper than other makes.

The obvious reply of the trade would be to all this—and as the trade always does reply—"We have tried it and found it no good." And I shall retort, "You have not tried it as business men who are out to capture the world's market would try it. You have shown no signs of initiative, imagination, or appreciation of your position as builders of industry." Then I shall be asked, "What do you call trying?" They, of course, ought to know that themselves; but, in my opinion, no firm has tried unless it has engaged designers of the £1,000 a year class, nor has any firm I know of offered £5,000 even to make it worth while getting a design which would set it up in business—real business. And the only argument the trade can bring up against me in face of my "extravagant" ideas must be this: "Design has reached finality; we have nothing to learn. Engines cannot be made, and never will be made, more cheaply than to-day, and nothing is good that is cheap." That, Mr. Editor, is, I consider, the *real* dictum of the trade of this country to-day, though, of course, the producer of a new piston ring, sparking plug, or split pin shouts out at the top of his voice, "Alone I did it. See what marvels of ingenuity I have produced, and I am going to do something more wonderful still!"

J. H. LESTER.

TWO-STROKE V. FOUR-STROKE.

Sir,—I read with interest "Four-Stroke's" letter in *The Motor Cycle* of May 3rd.

I have ridden both two and four-strokes, and prefer the latter every time; but as regards the former, I rode a 2½ h.p. two-stroke from Lyme Regis to Southampton *vid* Dorchester and Wimborne, and averaged 28½ miles per hour. I weigh 13 st. 8 lb., and carried about 14 lb. of luggage on the carrier. Considering the hilly nature of the roads to Dorchester, I think you will agree that it was a good performance for so small a machine. It would climb practically anything (gears 5½ and 8½ to 1), but was distinctly slow on hills.

Harrogate. R. FUSILIER.

Sir,—"Four-stroke" asks, "What the two-stroke rider has to say as regards speed."—I have ridden almost every type and own an 8 h.p. Zenith, but lately have been enabled to ride alternately, and carefully to compare a 2¾ h.p. Calthorpe-Jap and a 2½ h.p. Sparkbrook-Villiers. Both are 1915 models. The carburetter is in each case a Senspray, and both have a two-speed gear. As "Four-stroke" says, the two-stroke's maximum is 40 m.p.h. Probably 35 m.p.h. is nearer the mark, except under very favourable conditions. But he adds that the four-stroke "will do another 10 m.p.h." That means a total of 50 m.p.h., but I doubt it. No baby four-stroke I have ever met will do anything like 50 m.p.h. under ordinary road conditions and in touring trim. For the information of those who are interested I append a table of comparison, embodying results which have been carefully checked, and, as far as possible, rendered free from guesswork of any kind.

	Two-stroke.	Four-stroke.
Speed	35-40 m.p.h.	35-40 m.p.h.
Starting	Easy.	Moderate.
Climbing ...	Powerful.	Noticeably less power.
Oil consumption ratio	4	5
Petrol	60-80 m.p.g.	90-110 m.p.g.
Vibration	Little.	More pronounced.
Decarbonise ...	Every 850 miles.	Every 1,500 miles.
Workshop jobs and adjustments ...	Simple.	More complex.

It will be noted that the four-stroke scores on petrol consumption and less frequent decarbonising. On every other point the two-stroke is superior, except speed, which is almost the same. At the present time I should vote for the four-stroke, because of petrol shortage, but when that rare spirit becomes plentiful again I am for the two-stroke for all hack-work. ZENO.

London, S.E.

A TRIBUTE TO BRITISH MOTOR CYCLES.

Sir,—I am an old rider of a few French and English-made motor cycles, and, of course, since my last journey in England, a very enthusiastic reader of your publications *The Motor Cycle* and *The Autocar*.

As a Frenchman, I am very interested in all British things of any kind, for the reason that Britain holds foremost place in the motor cycle world!

Many of your hints and tips have been very useful to me at the Front, where I rode a 4 h.p. B.S.A. model H, and with my civilian mounts, a 4 h.p. Triumph with sidecar and a two-stroke Radco solo. At the Front, where I was D.R. under a major commanding two batteries of heavy field artillery, I had several occasions of testing many of the other D.R.'s mounts; for example, B.S.A.'s, Triumphs, Royal Enfields, Rovers, Humbers, etc. I was amazed at the quality, the flexibility, and the strength of all parts of such motor cycles. You may understand how great is the estimation in which I hold all these marvellous models when I tell you that I am now, and will for ever remain, a propagandist of the British motor cycle, its value, its production, and its trade!

Prior to the war I was distressed by the position of motor cycling in our country, and I was thinking of recruiting members to form a "motor club" for the Parisian north suburban district, but the horrible Boches upset my projects.

I was only six months in London, and have picked up my knowledge of your language by reading your interesting paper. I thank you very much for this very useful and handy "teaching book." I am now employed on Government work as engine tester at the "Gnôme et Rhône" factory, which specialises on rotary aero engines. This is a very interesting job, but very hard, owing to the smoke and the noise, which never cease at all day or night.

The "Gnôme" of the "monosoupape" system (which means, literally, "one valve") is employed by your R.F.C. and the R.N.A.S. too. We had a visit this last winter from a military commission of officers and mechanics of the R.F.C., and I had the great pleasure of giving tuition to a few of those gallant and charming men.

With reference to motor cycles, I have remarked the difficulty of testing the sparking plugs and magnetos on the road, and I suggest making something like a clutch or free-wheel to make the magneto independent. Just fix a handle on the axle of the magneto and turn it; this will save much time *and great labour*. You know how hard it is to test a plug or magneto in the ordinary way. I cannot give you any development of my idea, owing to the various applications on different engines, but you will at once understand the principle. J. R. VACHERON.

France.

AIR PRESSURE IN TYRES.

Sir,—The statement of Dr. O'Rafferty in *The Motor Cycle* of May 10th, that tyres only moderately inflated last longer than those which are pumped up hard, surprises me. My makers say that the back tyre should be board hard and the front only a little softer. I have always heard that hard tyres are best for wear and more puncture-proof. I should be glad to hear what other readers think about this matter.

R. L. BOYD.

A VARIETY OF CONDITIONS FOR DESPATCH RIDERS.

Sir,—I noticed in your issue of 29th March two D.R.'s mentioned that pot-holes 18in. deep did not exist on the main traffic roads near the firing line. I do not wish to annoy my two comrades in any way, but I feel assured that the fifteen months of their riding in France has been spent upon those beautiful, straight, and wide roads which exist behind the line. I have had almost one year's experience, and could mention several main roads on the Somme front that possess holes much deeper than 18in. Several times I have run into a hole full of mud, which almost covered my front wheel. But I do not say that our "trusty mounts" bump out again, for they must be lifted out. My machine is a 4 h.p. Triumph, and it has served me splendidly; never once have I had to stop for engine trouble. Many other D.R.'s will know that I have not exaggerated, and perhaps some may try to enlighten our two friends.

B.E.F., France. W.T.P., R.G.A.

AIR V. WATER-COOLING.

Sir,—In reply to "W.F.C.," the detachable head of the Blackburne is perfectly satisfactory in practice. Even if it were necessary (which it is not) to renew the copper washer at the joints every time the cylinder was decarbonised the cost would be trifling. The tedious process of chipping carbon off the cylinder head with a long screwdriver, when the head is *not* detachable, should not be necessary on a practical machine. With regard to radiator, the pattern used on the Humber is what I should adopt, but with fewer and heavier gauge tubes and smaller size, as the fins on cylinder would allow of this. Exact sizes can only be determined by experiment.

I should like to take "W.F.C." a run in the sidecar of my Norton big single and see if after that he would seriously say that "the torque of a single is not good enough for sidecar work," etc.

For solo work on slippery roads, we must be content to sacrifice pleasure for safety, and here the multi-cylinder is in its right place. M. HITCHCOCK.

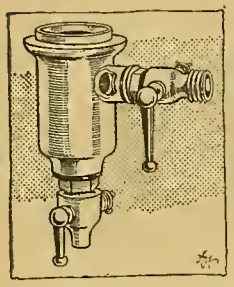
GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war

ILIFFE & SONS LTD.

USEFUL ACCESSORIES.

WHILE visiting Messrs. A. W. Gamage's recently we noticed in their motor department a rather ingenious combined motor cycle filter and petrol tap. This is designed to be soldered to the bottom of the tank. It consists of a trap which will catch any foreign matter which might settle at the bottom of the tank. In the base of the trap there is a small drain tap, while the petrol union tap is fixed some way up the barrel. A small piece of gauze is fitted to the exit, so that all the petrol is strained before flowing to the carburetter.



A combined filter and petrol tap.

We also noticed a very neat little valve grinding outfit, which consists of a cardboard box containing two tubes of ready mixed Carborundum valve grinding paste, coarse and fine, two strips of Carborandum paper for cleaning the platinum points, and a book of leaves

A small Carborundum valve grinding outfit.

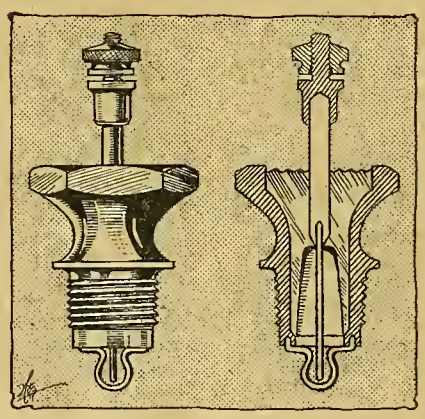
of Carborundum cloth, which are extremely useful. With the outfit is included a small booklet entitled "Perfect Valves and Proper Compression," giving instructions for the use of Carborundum.

A NOVEL SPARKING PLUG

A NOVEL and interesting plug, fitted to a Powerplus Indian used by Mr. Bridgeman, was shown to us while on a visit to the offices of the Hendee Manufacturing Co., 366-368, Euston Road, London, N.W., on a recent occasion. The insulating material is quartz, the top of which has a corrugated surface, the object being to deflect the light. By means of this plug the colour of the explosion is clearly visible to the rider, and useful information as to the running of the engine can thus be gathered.

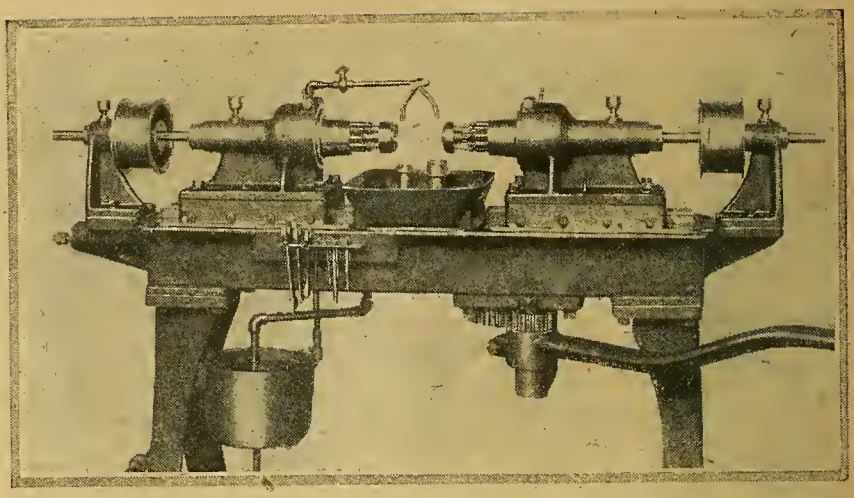
In a leaflet issued by the makers of the Anderson plug, as it is called, it is stated that the steel and quartz are welded together, forming a solid integral mass, and that the plug is unbreakable and absolutely gas-tight, owing to the absence of joints and loose parts.

It is very interesting to note how the colour of the explosion changes from the moment the engine is started until it has settled down and the mixture becomes approximately correct.



The Anderson quartz plug, by which the regularity of the sparking can be determined.

The peculiar design of the electrode is also worthy of notice. Owing to the restrictions on imports these plugs are unobtainable at the present time.



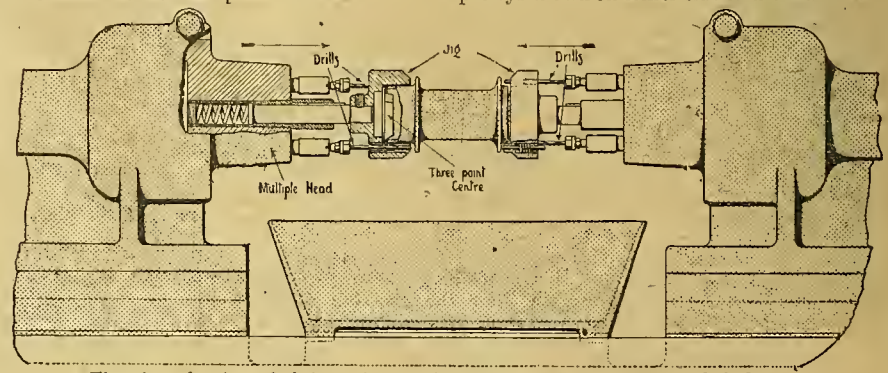
The Langelier machine used for drilling spoke holes of hubs.

DRILLING THE SPOKE HOLES IN A HUB.

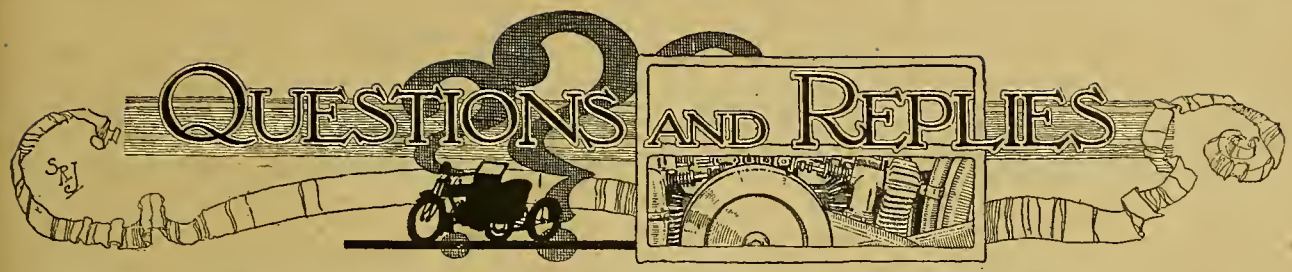
THE rapid production of motor cycle parts is greatly assisted by the use of automatic machinery and of tools which are capable of performing the many necessary operations with accuracy and despatch. To the latter class belongs the drilling machine which we illustrate on this page.

This machine is made by the Langelier Manufacturing Co., of Providence, R.I., U.S.A., for the expeditious drilling of the spoke holes in the hub flange. The alternate holes in each flange are drilled at the first operation. The hub is then turned till a small peg in the right-hand jig slips into one of the holes and the remaining holes are completed. In a test three hubs were drilled in less than one minute, and, as there were thirty-six holes per hub, this works out at upwards of 6,480 holes per hour.

The line drawing shows the machine drilling a rear hub. The jigs are separated by the lever shown on the right of the photograph and the hub placed in position; it is then firmly held between the rings of the jigs and three-point centres. As the drills are brought together and do their work, the jigs slide into the heads against the pressure of springs, which have sufficient stiffness to ensure a firm grip. The drills are, of course, driven by belts running over the pulleys shown on either side of the machine.



Elevation, showing a hub in position with the drills about to pierce the hub flange.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Carrying a Spare Wheel.

I have a 1914 6 h.p. Royal Enfield combination, and desire to utilise a spare rear wheel which I have, and shall be glad if you can offer me a suggestion as to the best means of carrying this spare wheel about with me; at the same time, I desire to use the rear carrier for pillion riding.—J.L.

You could sling the spare wheel between the body and the chassis, or between the saddle and sidecar, and make a platform extending from the running board to the chassis.

Carburetter Adjustment.

I have an Alldays 3½ h.p. motor cycle, Amac carburetter. It has run about 12,000 miles; it starts easily, climbs hills splendidly, runs on the level quite satisfactorily up to thirty miles an hour; beyond that it feels and sounds as if the engine gets too much air and it overheats. I have the air lever open about one-third—to have it closed more than that retards the speed. Thinking there might be a leakage in the throttle slides I have soldered up the fixed air-holes underneath the spray, but this makes no difference. I have experimented with different jets up to size 31, but with no better results. There is slight play in the inlet valve guide, but not much. The gear is about 4¾. I should be glad if you could suggest anything to improve matters.—H.W.H.

Possibly the petrol is not reaching the float chamber as freely as it should, with the result that the petrol level falls too low when running at speed. Clean filter (if one is employed), and after minutely cleaning the carburetter, test the flow of petrol at the jet. The Amac people turn out a special tube, which is placed in the carburetter in place of the jet for adjusting the level. Too much air would affect the running at low speeds more than at high. At small throttle openings the engine would run unsteadily, firing at intervals through the carburetter. It is difficult to advise you without testing your machine, but in all probability the engine is getting too little air. Thoroughly clean the carburetter gauze, and certainly remove the solder from the main air-holes, as it will entirely upset the working of the carburetter.

Starting an Auto-wheel.

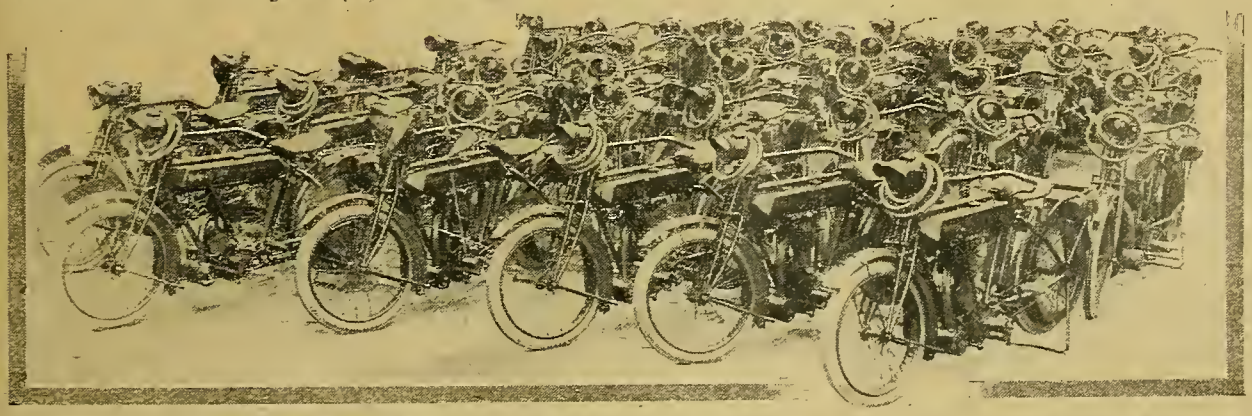
(1.) I have a Wall auto-wheel, but cannot get the little engine to start on its own weight, as the wheel drags all the time on the ground unless some great extraneous weight, like the heavy hand of a person running alongside of it, is put upon it. Can you tell me the cause and a remedy? (2.) Could an auto-wheel be made to take the place of the side wheel of a tricycle? Would the side-push interfere with the proper steering?—T.J.P.

(1.) We are inclined to think that the trouble is due either to the exhaust valve lifter not lifting sufficiently to release the compression completely, or to the fact that the engine requires petrol or paraffin to be injected, so as to free the piston rings. First of all try an injection of paraffin. If this does not free the engine sufficiently, adjust the valve lifter so that the valve is raised rather more. (2.) We do not think that the auto-wheel could be made to take the place of the side wheel of a tricycle, though it would not affect the steering appreciably.

Air Leaks.

I shall be much obliged if you can assist me with your expert advice. My 1913 four-cylinder F.N., for long an easy starter, has lately given much trouble. The symptoms are: After petrol injection the engine starts with a pull over of the back wheel, revolves rapidly for a few seconds, and then peters out. Tickling the carburetter will ensure a second start, but the gear must instantly be put into "free," and the finger kept on the carburetter needle to "tickle" as soon as signs of flagging appear, as they do every few seconds. Humouring the engine in this way, it can be warmed up, and will then start easily on the road and run quite well, though with not the power it should possess. The machine was thoroughly overhauled in August, 1915, since when the mileage has been under 600. All bearing wear was taken up and new rings put in, etc. The magneto has twice lately been overhauled and the points trimmed and adjusted. A good spark is produced at the terminals. I fancy there is a leakage somewhere, but I cannot trace it.—E.C.Y.

The trouble looks uncommonly like an air leak at the carburetter or induction pipe union, or possibly weak inlet valve springs, or a leakage of some sort round the valve seating. We should advise you to raise the petrol level slightly.



A batch of Rudge-Multi motor cycles, built to the order of the Belgian Government for use in the army of our gallant Allies.

Rudges in the T.T. Race.

Will you please inform me when a Rudge motor cycle was first ridden in the T.T. races, either privately or trade owned? S.A.—(Despatch Rider).

The first time a Rudge motor cycle was entered for the T.T. race was in July, 1911.

The Petrol Licence.

Supposing I have a small stock of petrol, is there any Order in force to prevent my using it up on an occasional ride, even if I cannot get a permit to buy more? Can I be called to account for being on the road without a petrol licence?—T.B.F.

If you have a small stock of petrol there is nothing to prevent your using it on a motor vehicle. The petrol licence merely permits you to purchase petrol, and is no concern of anyone except the Petrol Control Committee and the man who supplies you with fuel. You are only compelled to produce it either to the garage man or to a representative of the said committee should you be asked to send it.

Engine loses Power and Stops.

I have got a small flat twin. It goes all right for about three-quarters of a mile and then loses power and stops. The plugs are very hot indeed, so that one cannot touch them. They are not sooted. I tried a smaller jet but it made things worse and the machine would not go half a mile. I don't think I have over lubricated. Can you suggest a reason for this malady and a cure?—T.O'C.D.

We think the trouble is very likely to be due to the fact that your tappets require adjusting. The clearance should be equal to the thickness of the blue cover of *The Motor Cycle*. Also see that your valve springs are sufficiently strong, and that your valves are in good order.

The Use of the Clutch.

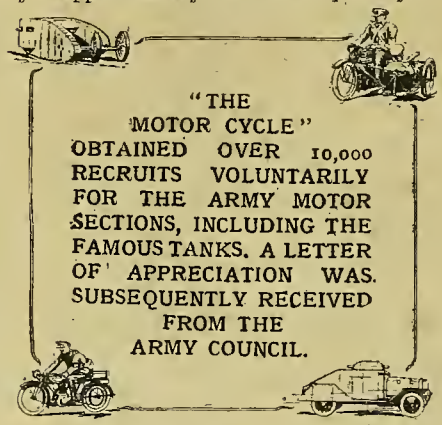
During the last four years I have been riding a 6 h.p. motor cycle combination fitted with a two-speed gear, but no clutch. I am now changing my outfit for one with three speeds and hand or foot controlled clutch. Would you kindly inform me on the following: (1.) Does one drive using the clutch as one uses the exhaust lifter on a two-speed machine, *i.e.*, lifting the clutch lever when slowing down and dropping it again for greater speed? (2.) Is the exhaust lifter only used for starting the engine?—J.R.

(1.) You use the clutch, of course, for starting purposes and also in traffic, but not, as a general rule, for decreasing speed. That should be done with the throttle. When changing gear it is best to use the clutch, also just touching the exhaust lifter or closing the throttle slightly as you take the clutch out, so as to stop the engine racing. Do not slip the clutch to an abnormal extent. (2.) It is best to use the exhaust lifter as little as possible, just at starting and stopping, but there is no harm in using it with the throttle closed when you are descending a hill.

A Heated Crank Case.

(1.) After a short run of five minutes or so, if the crank case gets very hot, does it necessarily mean that gas is escaping past the piston rings? Is the only remedy an overhaul of the engine and new rings? (2.) After draining out the crank case of spent oil, how does one again correct oil level on a 2¾ h.p. single fitted with a Best and Lloyd drip feed?—C.E.H.

(1.) It does not always follow that when the crank case gets hot the gas is escaping past the rings. The crank case often gets hot through induction, and unless the metal is excessively hot we do not think you need have any cause for anxiety. (2.) The best plan is to disconnect one of the oil unions and inject by means of an oil gun the equivalent to three motor cycle pumpfuls. Any medium size squirt would give you approximately the correct quantity.


"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

Horse-power.

I should like to ask you about horse-power. Take my engine, for instance. It is a 3½ h.p. When I start it up, does it immediately develop 3½ h.p., or would it have to acquire a certain number of revolutions per minute before it developed this horse-power? Again, what is the basis of horse-power, and how did this term originate, and on what formula does an engineer work out the h.p. according to the c.c. of an engine? Referring to my first question, does a steam engine develop its full horse-power when its piston first commences its stroke?—H.J.B.

The term "horse-power" as applied to a motor cycle engine, and especially the nominal h.p. given by the makers, is a very elastic one. Your engine, for instance, would probably develop 3½ h.p. at, say, 1,500 revolutions, and until this number of revolutions per minute is attained the power developed would be considerably below 3½ h.p. By further opening the throttle and increasing the r.p.m. the power rises steadily, and then, even though the r.p.m. increases, it falls off slightly. This is what happens as a rule. Probably the maximum horse-power the makers claim that your engine will develop is 8. The term "horse-power" was originated by the famous engineer Watt, who calculated that the force exerted by a London dray horse working eight hours a day was equivalent to lifting 33,000 lb. one foot high in one minute. Horse-power is usually found by means of a brake test or electrically. Then there are various formulæ employed, a good one being that known as the Hospitalier, which is as follows: $\frac{r^2 S N \text{ revs.}}{75{,}000}$. r = half the diameter of the cylinder (in c.m.), S = the length of stroke (in c.m.), N = number of cylinders, revs. = number of revolutions of engine per minute. A modern engine in good tune should give 1 h.p. for every 100 c.c. A steam engine develops its full power the moment it begins to work, as here we deal with expansion and not explosion. A steam engine, unlike one which is driven by petrol, does not depend on r.p.m. for its power.

Gear Ratios for a Hilly District.

(1.) I have a 5-6 h.p. combination geared as follows: 4½, 7½, and 13½ to 1. I reside in a hilly district, and I think that perhaps my machine is too highly geared. By changing the engine sprocket I can get the following ratios: 4⅝, 7¾, and 14⅓ to 1; or 5, 8¼, and 15½ to 1. Which do you recommend for sidecar work? (2.) Geared as it is my machine will take all general undulating roads on top gear, and long rises of one mile under very favourable conditions. Do you think it would take a general rise of, say, four or five miles on a top gear of 5 to 1? (3.) If it would not, would 8¼ to 1 be too low for continuous work? I find at present that I have to travel very fast to keep up the revolutions, and this is not always comfortable, especially at night time.—G.G.E.

(1.) We think that if you gear your machine with a top speed ratio of 5 to 1, and make up your mind to travel steadily when in top gear, it would give you greater satisfaction. (2.) You should also be able to take long rises on the top gear without opening the throttle to any very great extent. (3.) 8¼ to 1 is very low for second, and care would have to be used if you travelled much on this gear—that is to say, you must use plenty of oil and not open the throttle too wide.

RECOMMENDED ROUTES.

HUNTINGDON TO OSWESTRY.—N.H.K.

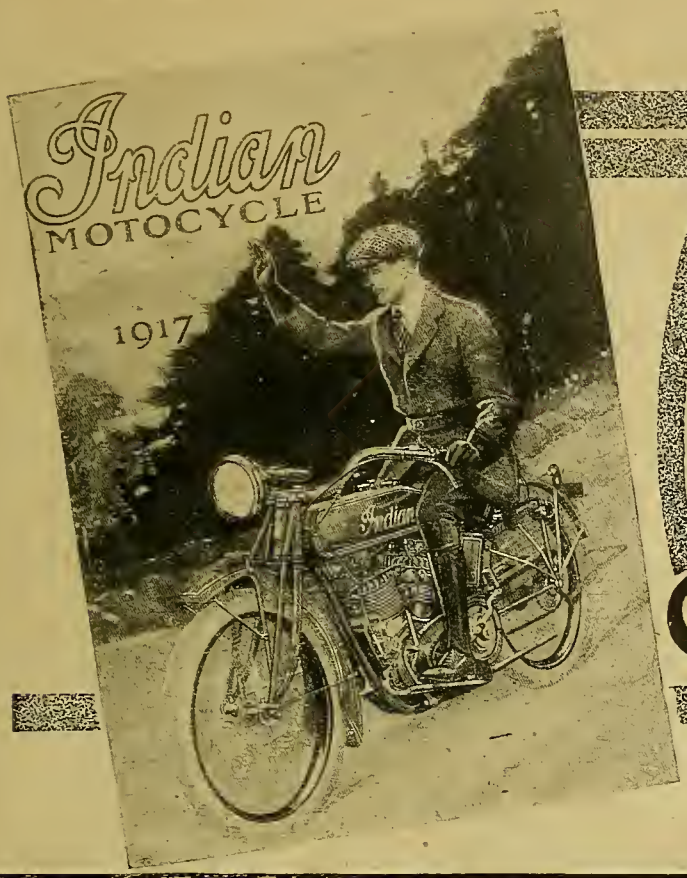
Huntingdon, Thrapston, Kettering, Market Harborough, Lutterworth, High Cross, Smockington, Atherstone, Fazeley, Weeford, Gailey, Crackley Bank, Oakengate, Shrewsbury, West Felton, Oswestry. Approximately 165 miles.

SHEERNESS TO TORQUAY.—J.B.

Sheerness, Maidstone, Ightham, Riverhead, Reigate, Dorking, Shere, Guildford, Farnham, Odiham, Basingstoke, Andover, Amesbury, Hindon, Wincanton, Ilchester, Ilminster, Honiton, Exeter, Chudleigh, Newton Abbot, Torquay.

YARMOUTH TO MERTON.—A.S.W.

Yarmouth, Acle, Norwich, Wymondham, Attleborough, Harling, Thetford, Barton Mills, Newmarket, Six Mile Bottom, along the Royston Road to the Coach and Horses Inn, Barkway, Barley, Ware, Hertford, Essenden, Potters Bar, Barnet, Regent's Park, Lancaster Gate, Shepherd's Bush, Hammersmith Broadway, Putney Bridge, Wimbledon Common, Merton.



"Count the Indians on the road."

HENDEE MFG. CO.,
"INDIAN HOUSE,"
366-368, EUSTON ROAD, LONDON, N.W.
Telephone—Museum 1643.
Telegrams—"Hendian, Eusroad, London."
AUSTRALIA—
109-113, Russell Street, Melbourne.
CANADIAN WORKS—
12-14, Mercer Street, Toronto.

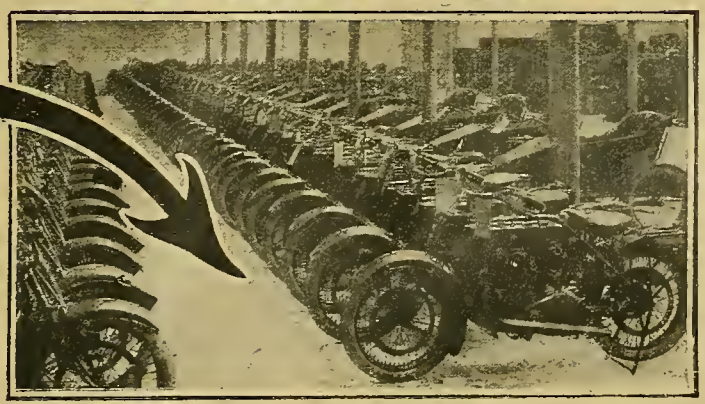
Indian

AFRICA—
Indian House, 127-9, Commissioner Street, Johannesburg.
Indian House, 579, West St., Durban.

ROYAL ENFIELDS and PALMERS for RUSSIA

We show below a photograph of the first batch of Royal Enfield motor cycles intended for the Russian Government, representing a portion of a large order recently placed. These models are built practically to standard specification, except that they are all finished in the "Service Green" colour. A striking testimony to the value of Palmer productions is afforded by the fact that they are fitted with

PALMER
ORIGINATORS OF THE TRIPLE RIB TREAD
CORD TYRES



Send for Palmer Map Book, and for particulars of Palmer Motor Cycle Tyres, which are helping to make History in the great War. Ready shortly.

THE PALMER TYRE, LTD.,
119-123, Shaftesbury Avenue, London, W.C., 2.
Cycle Tyre and Repair Depot,
105, St. John Street, Clerkenwell, E.C.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to _____ & Co. ILIFFE & SONS Ltd., and crossed _____

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

☞ DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

ABINGDON King Dick, 1916, 3½h.p., T.T., brand new, shop-soiled; cost £50, accept £35.—Percy and Co., 337, Euston Rd., London, N.W.1. [2811

Advance.

ADVANCE 6h.p. Twin Combination, Zenith gear, in good order; £22.—Rogers, Braughing, Ware. [2765

A.J.S.

A.J.S. Spares; prompt delivery — Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305

1916 (new March, 1917) A.J.S., 2¾h.p., free engine, hand clutch, run only 150 miles; £47.—Jordan, Albert House, Derby. [2604

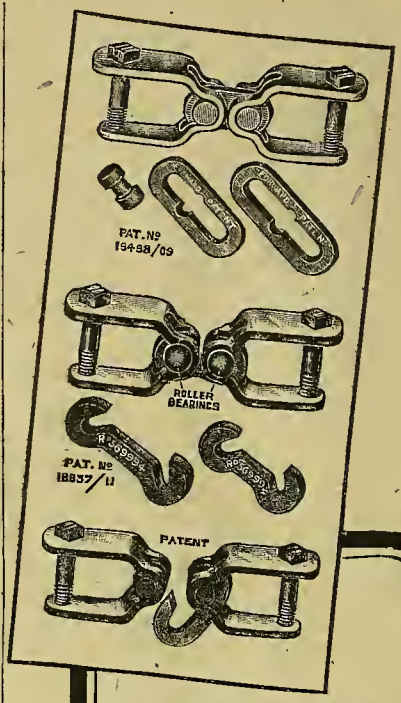
A.J.S. 6h.p. 1914 Twin Combination, 3 speeds, kick starter, chain driven, in nice condition; £55.—Percy and Co., 337, Euston Rd., London, N.W.1. [2817

A.J.S., 1915, 3-speed, clutch, T.T. bars, P. and H. head lamps, generator, rear lamp, tools, sound tyres, machine perfect throughout; £43/10.—Advertiser, 156, Gt. Portland St., W.1. [2859

2¾h.p. A.J.S., 1916 model, 3-speed countershaft gear, chain drive, detachable wheels, includes all accessories, condition like new; 50 gns.; guaranteed.—Wanchope's, 9, Shoe Lane, London. [2544

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796



FORWARD Fasteners

Satisfy H.M. War Office — and they'll satisfy you. They're the fasteners that never fail — that's why they are used by the Admiralty.

All the "cracks" and the leading manufacturers fit them — why don't you?

MODELS ILLUSTRATED.

THE FORWARD... ... 1/6
THE KING HOOK
Detachable 1/-
Adjustable... ... ... 1/3
THE CHAMPION
Detachable ... ... 9d.
Adjustable... ... ... 1/-

Ask for new Catalogue.

FORWARD MOTOR Co.,
35, Forward Works, Summer Row, Birmingham.

TAN SAD
(Trade Mark)
ADJUSTABLE SEAT & PETROL CARRIER
13 Models to suit all requirements.
Send for list & particulars.
TAN SAD WORKS
F.H. HEADLEY, 5a, Parker St., Birmingham.

Photography and FOCUS
Every Wednesday. Twopence.

IMPORTANT NOTICE.

Owing to the Whitsun Holidays, the issue of "The Motor Cycle" for May 31st must be closed for press earlier than usual. All copy and instructions for Miscellaneous Advertisements in that issue must, therefore, be in our hands not later than first post on Thursday, May 24th.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

Alldays.

ALLDAYS Matchless, 1914, 2½h.p., 2-stroke, P. and H., new Dunlop belt, and nearly new Clincher back tyre, coat, and 4 gallons petrol; bargain, £14.—A. Ruffell, 45, Sutherland Rd., Tottenham, N.17. [2660

Ariel.

ARIEL, 3½h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [2562

ARIEL, 1913, 3½h.p., T.T., good running order; £16. —Bennett, 318, King St., Hammersmith. [2783

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

ARIEL, 1917, not been used, 3½h.p., 3-speed countershaft; what offers?—Read, 10, Bartholomew St., Ipswich. [2737

1914 Ariel Combination, 3-speed countershaft; excellent condition; £45.—Parker and Son, St. Ives, Hnnts. [2843

ARIEL, 1914, 3½h.p., free engine, in real nice condition; £17/10.—Percy and Co., 337, Euston Rd., London, N.W.1. [2813

ARIEL, 1917 model, 3½h.p., actually here.—Lamb's, 151, High St., Walthamstow, E.17, and 80, High Rd., Wood Green, N. [2691

IMMEDIATE Delivery of new Ariels, 1917 3½h.p. models, 3-speed countershaft gear, chain-cum-belt drive; £69/10 cash, or easy terms.—Wanchope's, 9, Shoe Lane, London. [2546

Auto-Wheels

AUTO-WHEEL (Wall), perfect running order; first cheque, £4/10 secures.—Clarke, Furnisher, 74, Overstone Rd., Northampton. [X0269

GENUINE Wall Auto-Wheel, little used, splendid condition and running order, complete; £8/10.—Murray, 37a, Charles St., Hatton Garden, Holborn. [X0263

AUTO-WHEEL, Model de Luxe, 1914, just overhauled, £9; fitted to B.S.A. cycle, new Palmers Specials, horn, £12/10, complete.—204, Frederick St., Oldham. [X0250

Bat.

1916 Sporting Model 6-8h.p. Bat-Jap Combination, 3-speed countershaft; owner in France; what offers?—Box L3,659, c/o *The Motor Cycle*. [2855

BAT, 4½h.p. twin J.A.P., 2-speed, countershaft gear, in new condition, not used for two years; £48.—Lieut. Smith, c/o, 31a, Broomfield Rd., Chelmsford. [2860

8h.p. Bat-Jap, bought new January, 1914, C.B. sidecar, just had new chain fitted, tyres all good, excellent condition throughout; £48. — Oddie, Primet Bridge, Colne. [X0174

MOTOR CYCLES FOR SALE.

Bat.

6h.p. Bat-Jap, 1912¾, 2-speed gear box, chain drive, Swan sidecar, screens, hood, grid, Stewart, lamps, Pillion seat, only done 1,000 miles last two seasons, petrol if required; £42, or offer.—Collins, 8, Malta Rd., Tilbury Docks. [X0237

Bradbury.

BRADBURY, 4h.p., perfect, N.S.U. gear, Bosch; £23.—Ellis, 995, Abbeydale Rd., Sheffield. [X0221

BRADBURY, 3½h.p., Bosch mag., spring forks, in good order; £12.—Percy and Co., 337, Euston Rd., London, N.W.1. [2796

BRADBURY, 3½h.p., good condition, new back tyre, perfect running order; £20, or offer.—3, Barry Rd., Cadoxton, Barry. [4646

BRADBURY, 6h.p., 3-speed countershaft, moderate mileage, and Swan sporting sidecar; £59/10.—Motor Exchange, Horton St., Halifax. [2403

BRADBURY, late 1913, 4h.p., and sidecar, N.S.U. 2-speed gear, lamps, horn, speedometer; bargain, £29/10.—Rogers, Newington Terrace, Craven Arms, Salop. [X0244

4h.p. Bradbury, free engine, and multi gears, Rally coachbuilt sidecar, all new tyres, fully equipped; bargain, £28, near offer.—10, Devonport St., Commercial Rd., E. [2705

BRADBURY, 1914, with Montgomery sidecar, 4h.p., Bosch, 3 speeds, lamps, horn, nice condition; 29 gns.; exchanges entertained).—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [2773

Brough.

BROUGH, 1916, 3½h.p., T.T. Model, 3-speed Sturmey-Archer countershaft gear, done 5,000, good condition.—Minnesota, Downend Rd., Kingswood, Bristol. [X0236

3½h.p. Brough, twin-cyl. opposed engine, countershaft 3-speed gear, 1915 machine, speedometer, and all accessories; £46.—Wauchope's, 9, Shoe Lane, London. [2547

1915 3½h.p. Brough, 2-speed countershaft, flat twin, little used, total mileage 2,153, Miller lamp, horn, tools, footboards, perfect condition; £45.—F. Collins, 44, Kingston Rd., Portsmouth. (D) [2304

Brown.

BROWN, 3½-4h.p., good tyres, runs well; gift, £6/15.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [2776

B.S.A.

B.S.A. New 1917 Models H and K actually in stock.—Moss, Wem. [2388

B.S.A., 1916 Model H, all chain, 4¼h.p., 3-speed, in good condition; £56.—Below.

B.S.A., 1916 Model K, chain-cum-belt, 4¼h.p., 3-speed; £54.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

COLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A., 1917 Model K's in stock, £64; also one used ditto, £54.—Sharman, Brackley. [X0017

B.S.A., 1912, 3½h.p., 3-speed, clutch, with sidecar; £35; owner listed.—Lewis, Doveridge, Derby. [2610

B.S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester [0888

1913½ B.S.A., 2-speed, clutch, 1916 coachbuilt sidecar, carefully used, perfect; £36.—Campbell, Draper, Buntingford. [2726

1912 Clutch Model B.S.A., and accessories, in good condition; seen any time; £22.—Bounds, Garage, 223 High Rd., Kilburn. [2656

B.S.A., 1916, all chain drive, 3-speed countershaft gear, complete, lamp, and horn; £50.—Batchelor, Clarence St., Kingston-on-Thames. [2723

B.S.A. Combination, very smart turnout, everything perfect; any trial; £45, close offer.—Broom, 77, Marylebone Lane, Oxford St., London, W. [X02SS

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in belts, as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529

Calthorpe

COLMORE Depots, Birmingham, Manchester and Liverpool, for Calthorpe motor cycles. [0799

1916 2¾h.p. Calthorpe-Jap, Enfield 2-speed gear, little used.—Evans, 21, Norbury Court Rd., Norbury, S.W.16. [2706

CALTHORPE-J.A.P.'s are in stock at Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N. [2694

LATE 1915 2¾h.p. Calthorpe-Jap, perfect condition new tyres, etc., all accessories; £25.—Pales, 1S6 New King's Rd., Fulham. [264C

CALTHORPE, 1915, 2½h.p. J.A.P. engine, Enfield 2 speeds, in new condition; £24.—Percy and Co., 337, Euston Rd., London, N.W.1. [2800

CALTHORPE, 2-stroke, 1917, latest model, Enfield 2 speed; 33 gns.; brand new.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [263C

CALTHORPE-J.A.P., new, but slightly shop-soiled. Enfield 2-speed; special bargain, 31 gns.; usual price 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [2635

MY ADVICE ON CARBURETTERS

The wonderful results obtained, and the cups, gold medals, records, and 5tar performances made and won on my carburetters, including the much-coveted **Manufacturers' Trophy,** have been won by amateurs, and have not been the subject of any money bargain. Don't be misled by "puffing" advertisements which are obviously untrue. If you want a perfect "tick" over and the most wonderful slow running and violent acceleration, and at the same time marvellous economy in petrol, you **must** have a "BINKS" three-jet automatic jet damping carburetter—no others can approach it. The price is the only thing against it, but it is well worth it. Make this experiment—Put a "BINKS" carburetter on **any** machine that has **any** other carburetter, and note the effect. It is wonderful, and makes the engine run with steam engine like flexibility, and as each of the three jets are damped out when not in actual use, it is possible to get 120 to 150 miles per gallon on a 3½ machine, and 80 to 100 on twins and sidecars.

I send on approval and trial, and return your money (less examination fee) if you find my claims have been exaggerated.

Although this carburetter is automatic, there is an extra air lever, and you can let in air any time, or cold, clean air down-hill. This makes a good air brake, and cannot be done on any other carburetter. In other carburetters the levers have to be put in one exact spot, or the engine either roars round or stops. The "BINKS" has no exact spot, and when you take the clutch out the engine will not race.

Makes the SCOTT machine run dead slow like a steam engine. Special models for SCOTT machines, DOUGLAS, WILLIAMSON, TRIUMPH, and all twins.

Order one to-day instead of buying a new machine.

Price 49/- Plus 15% War Advance

complete with 6 spare jets, key, and full instructions.

Send for my practical **TREATISE ON CARBURATION** *Free.*

C. BINKS Ltd
Phœnix Works, ECCLES, nr. Manchester

MOTOR CYCLES FOR SALE.

Calthorpe.

CALTHORPE-J.A.P., 1917, latest model, brand new, Enfield 2-speed; in stock; 38 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [2634

CALTHORPE, 2-stroke, new, but slightly shop-soiled, Enfield 2-speed; special bargain, 28 gns., usual price 33 gns.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [2637

2¾h.p. 4-stroke Calthorpe, J.A.P. engine, Enfield 2-4 speed gear, new Dunlop tyres, lamps, and horn, in perfect condition; £27.—The Premier Motor Co., Aston Rd., Birmingham. [2847

1915 Calthorpe, 2-stroke, countershaft 2-speed, good condition throughout, footboards; bargain, £20; exchanges with cash either way.—Newnham, 223, Hammersmith Rd., W.6. 'Phone: 80. [2731

Centaur.

17 Gns., a sacrifice.—1913 Centaur, 3½-4h.p., chain drive, Simms mag., 80 m.p.g., complete with tools, etc., cash only.—Miller, 62, Hompstead Rd., N.W. 'Phone: North 1519. [2516

Chater-Jap.

CHATER-J.A.P., with coachbuilt sidecar, 5h.p. twin 2 speeds, handle starting, ready drive away; sacrifice £14/14.—Wandsworth Motor Exchange, Ebner St. Wandsworth (Town Station). [2777

Clyno.

CLYNO 1912 6h.p. Combination; £29/10.—Motor Exchange, Horton St, Halifax. [2405

CLYNO Spare Wheel, 40/-; Stewart speedometer, 25/-—Read, 10, Bartholomew St., Ipswich. [2739

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns [0894

Connaught.

CONNAUGHT, 1916, practically equals new; £28.

1915, in nice condition; £20.—Percy and Co., 337, Euston Rd., London, N.W.1. [2809

1914 Connaught, 2½h.p., in good order; £18, complete with accessories.—Kelvey, 194, Oxford Rd., Manchester. [X0247

Corah.

CORAH, 1913, J.A.P., 6h.p., Armstrong 3-speed, clutch, underslung Milliford sidecar, gear and engine overhauled, new tyres; £32.—36, Rye Lane, S.E.15. [2703

Coventry Eagle.

COVENTRY Eagle, 2-stroke, 1915, good order; £23.—47, Clock House Rd., Beckenham. [2651

COVENTRY Eagle 1916 Twin, sidecar combination, 3-speed countershaft; £69/10, or exchange for Morgan.—Holdsworth, 22, Belvoir Gardens, Halifax. [2404

Douglas

DOUGLAS, 1915, 2¾h.p., W.D., 2 speeds; £45.

DOUGLAS, 1915, 2¾h.p., T.T., 3 speeds; £44.

DOUGLAS, 1915, 2¾h.p., T.T., 2 speeds; £43.

DOUGLAS, 1914, 2¾h.p., T.T., 2 speeds; £36.

DOUGLAS, 1913, 2¾h.p., T.T., 2 speeds; £26.

DOUGLAS, 1912, 2¾h.p., T.T., 2 speeds; £20.

DOUGLAS 4h.p. Combination, free engine, 2 speeds, kick starter; £55; in nice order.—Percy and Co., 337, Euston Rd., London, N.W.1. [2815

1917.—Gibb, Douglas Expert, Gloucester, for earliest deliveries of The Motor Cycle. [X8510

DOUGLAS, perfect, new Dunlop tyres and belt; £23.—Miss E. Holland, Eastry, Kent. [X0217

1915 2¾h.p. 2-speed Clutch Douglas, fully equipped; £35.—F. Coupe, Walton-le-Dale. [X0283

1914 Douglas, complete, lamps, horn, numbers, etc.; £35.—Cross, Jeweller, Rotherham. [X0285

1912 Douglas, 2¾h.p., perfect, very fast; £20.—Pulford, Brinkley, Southwell, Notts. [2749

DOUGLAS, 1912, 2¾-3h.p. twin, mag., 2 speeds; £23/10.—I, Ebner St., Wandsworth. [2778

DOUGLAS, 1912, 2-speed, T.T., perfect all round; appointment.—Paterson, Stoneleigh Farm, Worcester Park. [2666

1915½ 2¾h.p. Douglas, 2-speed, T.T., in splendid condition; £45, or offers.—Raveascroft, 72, Cowley Rd., Oxford. [2825

DOUGLAS.—Wholesale and retail West of England agents; write us your requirements.—Moffat, Yeovil. Tel: 50. [5355

1916 T.T. 2-speed Douglas, perfect, fully equipped, spare belt, etc.; £42/10.—2, McDowall Rd., Camberwell Green, S.E.5. [2790

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles [0800

1914 2¾h.p. T.T. 2-speed Douglas, as new, and accessories; £34/10; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [2654

MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS, 1914, 2¾h.p., Model W, 2-speed, clutch, kick start, speedometer, lamps, etc.; £35.—Barrett, 2, Albion Rd., Clapham, S.W.8. [2672

DOUGLAS, 1913, 2-speed, new belt, tyres almost new, all accessories; nearest offer £30.—A. C. Walker, 90a, Elsinore Rd., Forest Hill. [2680

1915 2¾h.p. T.T. 2-speed Douglas, and accessories, in good condition; £43/10; seen any time:—Bounds, Garage, 223, High Rd., Kilburn. [2655

DOUGLAS, T.T., 1915, 2-speed, tyres new, speedometer, Klaxon, etc., excellent condition, very fast; £39.—Clive Scott, 42, Cheyne Court, S.W. [2658

DOUGLAS, 1914¾, in perfect order, not ridden 500 miles, speedometer, lamps, etc., as new; must sell immediately; £37/10.—Marsh, 14, Gladsmuir Rd., Highgate, N. [2750

DOUGLAS, 1915, 2¾h.p., 2-speed, kick starter, speedometer, lamps, and horn, machine really in tip-top order; £45.—Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N. [2692

TWO Douglases, both 2¾h.p. 1915 Colonial Models, one 3-speed, clutch, kick start, other 2-speed, both in exceptional condition and like new; genuine bargains, £45 and £43.—Write or call, Black Horse, Barbican, E.C.4. [2645

DOUGLAS Motor Cycles for delivery within 7 days to doctors, farmers, or others that require them for work of National importance.—Eli Clark, The Pioneer Agent, Leader Depot, 223, Cheltenham Rd., Bristol. 'Phone: 4169. Wires: Ignition, Bristol. [X9692

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012

EDMUND-J.A.P., 2½h.p., 2 speeds, the wonderful spring frame machine. We can deliver from stock; price 50 gns.; detailed list free.—The North Wales Motor Exchange, Holt St., Wrexham. [X8755

Elswick.

ELSWICK-PRECISION Lightweight, 2¼h.p., 2 speeds, almost new, 120 m.p.g., 2 gallons petrol; £21.—27, Ormeley Rd., Balham. [2678

Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2¼h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

ENFIELD Combination, 1912; £41/10, or exchange.—Motor Exchange, Horton St., Halifax. [2406

ENFIELD, 1917, 3h.p.; 55 gns.; brand new.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [2632

ENFIELD 1916 Combination, lovely turnout, all complete, £65.—51, Maplethorpe Rd., Thornton Heath, S.E. [2670

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Wauchope's, 9, Shoe Lane, London. [2864

ENFIELD 1917 6h.p. Combination, only run 400 miles; £85, no offers.—485, Upper Richmond Rd., East Sheen. [X0222

ROYAL Enfield Twin, 2-speed, drip feed, handle, very good condition; £20.—Roberts, Music Stores, Melton Mowbray. [X0121

1914 Enfield Combination, first-class condition, economical on petrol; what offers?—J. B. R. Messer, Henley-on-Thames. [2609

ENFIELD 1917 6h.p. Combination; 90 gns.; brand new.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., London. [2631

ENFIELD, 1913, 2¾h.p., £23; 2-speed, clutch, kick starter, new tyres, overhauled 1916.—Court, Portland Place, Leamington. [X0273

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock for immediate delivery.—See below.

1917 6h.p. Enfield Coachbuilt Combination, with apron and mat, 2 speeds, clutch and starter, 90 gns.; extra for hood and screen, £4/19.—Below.

1917 3h.p. Enfield, solo or sidecar mount, 2 speeds, clutch, and kick starter; 55 gns.; sidecars from 7 gns.—Below.

1917 Enfield Two-stroke, 2¼h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright St., Birmingham. [X0258

ROYAL Enfield Lightweight 3h.p. Twin, spring forks, mag., good running order; £12.—Murray's, 37a, Charles St., Hatton Garden, Holborn. [X0262

ENFIELD Coachbuilt Combination, specially flange fitted Binks carburetter, and for substitute fuel, 15-16, almost new condition, Watford speedometer, Lucas lamps; £65; thoroughly genuine bargain.—Mason, 31, Watford Rd., King's Norton, Birmingham. [X0257

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IF YOU ARE DESIROUS OF BUYING EITHER A

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HUMBER, 1914, 2h.p., perfect order, as new; £16/10.—Eckworth, 3, Tower Rd., Bengeo, Hertford. [2652

1911 3½h.p. Tourist Humber, £15/10; 3½h.p. Humber, £13/10.—Motor Exchange, Horton St., Halifax. [2412

HUMBER, 3½h.p., 1913, 2 speeds, in real nice condition; £20.—Percy and Co., 337, Euston Rd., London, N.W.1. [2814

HUMBER, 3½h.p., just overhauled, new tyres, 2-speed, handle starting, coachbuilt sidecar; £26.—Smith, 37, Hanover Sq., Bradford. [X0276

1912 Humber, 3½h.p., 2-speed, lamp set, exceptional condition, 10 gallons petrol given; £18, offer; after 8, or week-end.—Hall, 47, Honeybrook Rd., Balham. [2846

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Influence of Aero Engine Design.

ALTHOUGH primarily devoted to the subject of aircraft and motor car engine design, a lecture delivered by Mr. Louis Coatalen before the Aeronautical Society of Great Britain last week is of considerable interest to motor cyclists. We have often pointed out that there are many points in common in the design of an aero engine and a motor cycle engine, consequently the deductions of Mr. Coatalen are interesting and instructive at this juncture, particularly so when it is remembered that the development of aircraft engines is proceeding at an extraordinary rate, whereas by reason of the war motor cycle design is at a standstill, or comparatively so. We have stated over and over again that in our opinion many of the improvements embodied in the successful aircraft engine of the future will be reflected in the future design of motor cycles.

As further support for our assumption we need only quote the outstanding desiderata instanced by the lecturer in designing an aircraft engine. He summarises them thus:

> (1.) Light weight combined with low fuel and oil consumption per horse-power.
> (2.) Reliability.
> *(a.)* Simplification. *(b.)* Foolproofness. *(c.)* Accessibility. *(d.)* Standardisation. *(e.)* Suitability of exterior form, so that the power plant may be accommodated conveniently . . . and occasion the minimum displacement.

An interesting observation was that it is impossible to lay down any arbitrary rules as to any one type of aircraft engine being suitable for the needs of all aircraft service. Such a remark might well have been made in regard to motor cycle design. Those needs are almost as varied as are the demands for special varieties of steel and alloys. Aero engine design, observed the lecturer, resembles motor car engine production in this particular—it is all the time a question of compromise. It is interesting to note that the V type engine with either twelve or eight cylinders per unit is the type most generally favoured for aircraft work, and next in order of importance is the radial type engine, whether of the rotating or the fixed variety. At the moment it would be difficult to say whether either of the last two types of engine will figure to any considerable extent in the motor cycles of the future, but there are experienced designers who favour the type. One interesting point which the adoption of a rotary engine on a motor cycle would bring up would be the gyroscopic effect in cornering.

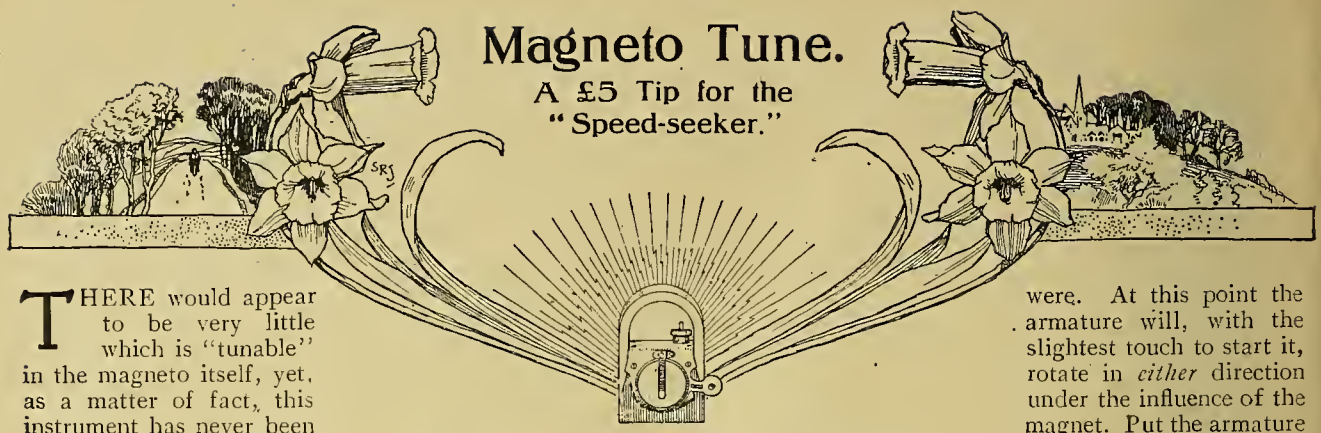
An unusual type of engine was instanced, having eighteen cylinders: three sets of six, the centre set of cylinders being upright, while those on each side inclined at an angle of 40°. Those who recall the three-cylinder fan-type Anzani engine first used on motor cycles will see again what an excellent school the motor cycle has proved. In order to achieve maximum power output on aero engines, the lecturer favoured two exhaust valves and two inlets per cylinder. This arrangement permits a good shape of engine head as well as the best sparking plug position, *i.e.*, vertically in the centre of the head.

Concerning aluminium alloy—another attractive problem before the motor cycle designer at the present time—Mr. Coatalen said that a series of experiments with aluminium alloy cylinder castings over a period of more than twelve months had proved the superiority of that material. Completely satisfactory results are obtainable when precisely the right alloy is handled with knowledge and is applied on tested designs. Such a view should surely impress motor cycle designers who have still to consider the possibilities of aluminium alloy both for cylinder castings and for pistons. It is nearly two years since *The Motor Cycle* predicted the extreme probability of an almost entirely aluminium engine after the war, *i.e.*, aluminium crank case as at present, in conjunction with an aluminium cylinder with a steel or cast iron liner and aluminium pistons, though no such type of motor cycle engine exists at present.

An index to the advertisements in this issue will be found on the page facing the back cover.

Magneto Tune.

A £5 Tip for the "Speed-seeker."



THERE would appear to be very little which is "tunable" in the magneto itself, yet, as a matter of fact, this instrument has never been neglected by the real experts. Those who studied the art of obtaining another mile per hour from a machine already tuned up to concert—or rather racing—pitch, could not afford to overlook the magneto.

Before attempting to tune any part of a power unit, it must be determined first of all what is necessary for ultra-efficiency. It is useless following haphazard methods in this, the most difficult of all parts of the game.

Now, in the case of the magneto, it is found that we want:

(1.) A spark to occur at the sparking plug.

(2.) The fattest and hottest spark which it is possible to obtain in order that it may live when under high compression, and that it may ignite the mixture in the cylinder quickly and completely.

Remember that a very good spark may exist when the plug is tested under atmospheric pressure, and yet may become very poor when in the cylinder subject to high compression. The reason for this is, of course, that the denser the air or gas, the more difficult is it for the current to jump the gap at the plug points. Now a very important yet little realised factor in obtaining a fat hot spark is to allow it to occur at the moment when the armature in the magneto is cutting the greatest number of lines of force. This moment can be termed that of "maximum intensity." In order to do this, the contact breaker points must separate when the armature is in this position. "But surely the magneto manufacturer will see to this!" My reply is that, unfortunately for the "seeker after speed," he does not. The magneto maker does not cater for the speed merchant. The person upon whom he relies for his sales is the "average rider." Standard magnetos are always arranged so that the point of maximum intensity occurs when the contact breaker is somewhat retarded. The idea of the manufacturer is, perhaps, that the fatter spark will be more useful for starting up purposes than for speed. He is probably correct, but we are at the moment seeking for that little bit of extra power.

Working Instructions.

Having stated the case, let us now discuss the best method of carrying it out. There are two ways of doing this. To start with, it is easy to recognise the position of maximum intensity of the armature. Just take off the contact breaker cover and the cam ring and rotate the armature until it is at the top of its magnetic "pull"—on the top of compression as it were. At this point the armature will, with the slightest touch to start it, rotate in *either* direction under the influence of the magnet. Put the armature into this position, and replace the cam ring. Now retard or advance the contact breaker until the platinum points are just about to separate. *This* is the position of the contact breaker in relation to the armature which we require to give the best spark. It is probably now found that the ignition is retarded a little, so advance the timing of the magneto relative to the piston, and the whole job is done. It is seen that we have now a new position for our spark lever. Of course, if it is preferred to keep the old position of the ignition control, it will be necessary to alter the position of the contact breaker on the armature-shaft. To do this the contact breaker must be "keyed" on in a different place. It is not difficult in most magnetos to press back the old "feather," or "key," which is on the back of the contact breaker, and hacksaw or solder a new one in the required position, which must be found by experiment, as described above. This, however, is hardly a job to be undertaken by an unmechanical rider.

An Extra Mile per Hour.

The motor cyclist must not expect any wonderful transformation to his machine after this experiment. If, however, he has a 3½ h.p. which will already do something in the neighbourhood of 60 m.p.h., he can, if this be done, anticipate an extra mile per hour at least. It would obviously be foolish to trouble about this little tip if his engine were previously in such poor tune that 5 m.p.h. could easily be added by carburetter adjustments or refacing the valves.

With regard to the actual timing of a magneto, it must be remembered that excessive advance puts only a strain upon the engine, even at speed. Advance the magneto no more when you find that no farther increase of speed is being obtained.

The tip described in this article is interesting, because it is one of the few points in which a magneto can be "tuned" in the real sense of the term. It was used by a small number of the pre-war speed men. Before one of the big Continental races, a French expert was offering it to our competitors at the modest price of £5 a time! However, as every extra mile per hour after 60 m.p.h. in a 3½ h.p. machine probably costs this amount, the sum was not really exorbitant.

The writer is, of course, assuming that the magneto is in good condition in the ordinary way—contact breaker points, carbon brushes, etc., all O.K.

M.C.B.

OCCASIONAL COMMENTS BY IXION

Utility v. Fads.

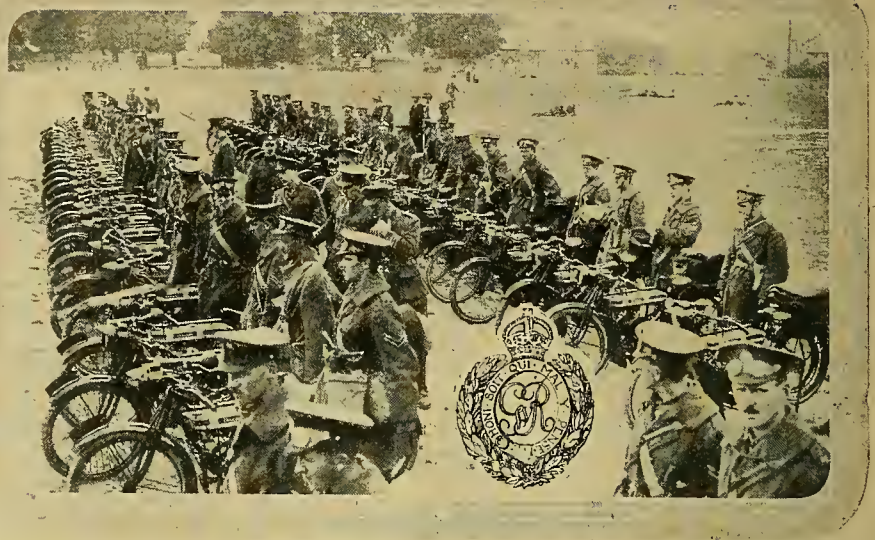
I WAS talking the other day to a man who has a wide and varied experience of the trade, and he gives it as his firm opinion that it is pleasanter in all respects to cater for the demands of commerce and industry than for those of pleasure. The profits are bigger, the demand is steadier, and requirements are more uniform. Translated into terms of motor cycling, this means that the golden age for our trade will begin when it ceases to cater, first and foremost, for the individual sporting man, competition rider, and week-end or holiday tourist, with all his fads, prejudices, and inefficiencies, and bases the bulk of its output on motor cycles intended primarily for utility purposes, *e.g.*, for parcel carriers, and for solo machines employed for business purposes. He would rather sell one machine to an insurance canvasser or a commercial traveller or a country doctor than three to a Brighton road flapper carrier or Wisley Hut braggart. He does not question the part which the sporting rider has played in developing the industry, by riding machines and boosting them, in days when staider men regarded every motor cyclist as half-crazed. But he asks us to reflect how much pleasanter manufacture has been in this respect since the war began, when factories ceased to plead with, bully, or cajole, Tom, Dick, and Harry, and began to hand over machines by the hundred or five hundred to the War Office or Admiralty. Such broad and simple methods of disposing of an entire output can only occur in war, but when utility motor cycles are universally used, the motor cycle trade will resemble the push bicycle trade, in that factories will seldom be bothered to death by individual customers. The agent will be more of a buffer between maker and user than he is at present, and the customer will less often have cause to be obstreperous.

The Utility Machine.

IN the view of the above trader, the genuine utility motor bicycle is not yet in sight. He lays down five essential qualities—cheapness, comfort, simplicity, lightness, and reliability. Of these he considers that only the fifth has yet been attained. Cheapness he defines under a price limit of £30, ready for the road. Comfort he expounds at a degree which as yet only characterises a very few of our most refined spring frames with unusually well balanced engines. Simplicity he considers will demand either a substantial single-cylinder engine similar to many already existing, or else a multi-cylinder which will maintain its power and tune for at least 3,000 miles, or alternatively be easier to retune than most modern multi-cylinders. Lightness he sets at a limit of 160 lb. Such a machine should sell as freely as a push bicycle, and to the same type of customer. When it appears, the trade will be less worrying, more steady, and far more profitable. But my friend is clearly asking for "some bike." A 160 lb. spring frame £30 machine, equal in quality to our best present-day mounts, is hardly on the horizon at the moment.

Our Waggish Government.

THE other day a party of subalterns had an amusing and irritating experience whilst returning to duty from distant homes. They set out duly provided with petrol permits, and according to custom ran their tanks pretty well dry, and then stopped at a small town for replenishments. Calling at one garage after another, they were met with the curt reply, "No petrol." By carefully sharing out such surplus as the biggest tanks in the party contained, they managed to scrabble through to the next centre of population, where they replenished the inner man at a suitable hostelry, renowned for its beer, and then ordered petrol from the ostler. "Sorry, gentlemen, we haven't any." Consternation. The proprietor is summoned. The dread announcement is true. Supplies are temporarily held up somewhere. Whether the Pool Board is reorganising its staff and transport: whether the Government is taking a census of the stocks in the country: or whether the Petrol Committee is merely playing permit-holders a little practical joke, nobody knows: but, anyhow, no petrol is being delivered for the moment to garages, and permits are about as much use as a five centime French note on a bank in Lille. Can these little trifles baulk British officers? Perish the thought. Our tactical ingenuity is never failing. The best-looking subaltern —"Cherub" to his intimates—is detailed to assault whichever garage shall prove to possess a lady clerk of susceptible appearance. Another tired-looking warrior is equipped with two sticks and an artificial limp, and gazetted to lay siege to the motherly wife of the local ironmonger. The most Prussian of the party is offered the welcome job of intimidating any callow youth found in charge of precious spirit. The remainder are organised as a patrol to reconnoitre the spirit stores: and in the course of half an hour the party musters at the rendezvous with a nice little supply of fuel, extorted by a variety of wiles, threats, and cajoleries. On arrival at the next town the same tactics are repeated: and the party complete their journey a little behind time. Moral: Until Lloyd George, or some other equally responsible man, personally takes charge of the petrol supplies, it is wise to strap a two-gallon can on the carrier, and be ready for emergencies of this kind.



This article, by the Editor of THE MOTOR CYCLE, *has been written for simultaneous publication in the American* MOTOR CYCLING AND BICYCLING, *with the object of assisting our new Ally in the training of a motor cyclist despatch rider.**

THE motor cycle is playing a leading part in the present war—the greatest conflict of all times. As a means of rapidly transporting a machine gun on a sidecar chassis it is well known. In its passenger form it is in extensive use by all the Allies for rapidly conveying officers from place to place, but it is as a despatch rider's steed that it has shown itself pre-eminent, no matter what the state of the roads or weather.

The development of the design and dependability of the modern motor cycle owes much to the enthusiastic amateur. Before this war it was essentially a sportsman's mount, and few imagined that motor cycles, although they had been developed to such a high degree of perfection, were destined to play so important a rôle in a coming world war. Just as the motor cycle as an implement of war was bred in peace-time, so, too, was its rider being usefully shaped by the love of mechanics his mount engendered. For a mere rider is of little service as a despatch rider, he must be part and parcel of his mount, alert, ready for emergencies, and quick to diagnose a fault in his machine, and equally smart in effecting the necessary adjustment.

The First Call.

One of the first discoveries at the outbreak of war was that a number of despatch riders was needed for the British Expeditionary Force. The War Office issued an urgent appeal to motor cyclists to volunteer for immediate service. Among the many who at once came forward was a large number of University undergraduates—just the type of man the War Office wanted. They could not hope to get trained despatch riders at a moment's notice; but here they had a number of young men, fit and keen, intelligent, and of good education, and many of them with a fair military knowledge gained in the Officers' Training Corps. As soon as they enlisted the despatch riders were fitted out with uniform and equipment, promoted corporals, and sent off to join the Divisional Signal Companies—a dozen or so to each. Here the motor cyclists found themselves in the position of amateurs among a company of professional soldiers, but their keenness and eagerness to learn soon disarmed any slight suspicion which the latter may have felt. They had, of course, a great deal to learn—far too much for them to acquire in the few days before they went abroad. Some of them knew the elements of cavalry and infantry training, and had some idea of tactics, but of the organisation of an army in the field—a most important subject for the despatch rider—the great majority were entirely ignorant. Naturally, the riders found this ignorance a considerable handicap in the first days of their serious work.

What the D.R. should know.

Ideally, the despatch rider should know not only how an army is organised into army corps, divisions, brigades, and all the numerous smaller formations, but he should know by name, and, if possible, by sight, all the generals, chief staff officers, heads of departments, and commanders of units throughout his division. This was a knowledge which, in his case, had to be acquired here and there among the vicissitudes of strenuous and dangerous work in the field.

Motor Cyclists in a War of Movement.

During the retreat from Mons and the subsequent advance from the Marne to the Aisne, the army was constantly on the move. In operations such as these there is usually no time to lay down telephone wires between different units. Consequently the main duty of keeping touch between the various formations rested upon the motor cyclist despatch riders. Day and night they were hurrying to and fro over roads crowded with transport and artillery. In the early days of the war they had few maps, and those not easily intelligible; often the only information they could get of their destination was both slight and unreliable; perhaps the brigade to which they were going had moved its position some hours earlier, and they would have to scour the country for it. When riding at night it was almost equally dangerous to run into one of our own outposts as it was to encounter an enemy patrol. One night a despatch rider, traversing in the dark a road

*Passed by the Press Censor.

The Work and Training of a Despatch Rider.—

he knew to be dangerous, was challenged by a sentry. Thinking it was an enemy, he at once put on speed, crashed into a wire entanglement stretched across the road, and as he fell received a volley of rifle bullets. Later, when he recovered consciousness in hospital, he discovered that it was a British outpost which had ambushed **him!** Added to the danger and excitement of the work was the physical fatigue. During the first two months of the war there was little rest for motor cyclists. As soon as one message was delivered, another was ready, and a good night's rest was impossible.

But in spite of difficulties, hardships, and inexperience, the despatch riders of the First Expeditionary Force did splendid work, for which they were warmly commended by Field Marshal Sir John French in his despatch of November 20th, 1914.

"Carrying despatches and messages at all hours of the day and night in every kind of weather, and often traversing bad roads blocked with transport, they have been conspicuously successful in maintaining an extraordinary degree of efficiency in the service of communications.

"Many casualties have occurred in their ranks, but no

PHASES IN THE LIFE OF A DESPATCH RIDER IN TRAINING.

(1) A despatch rider hurrying off to deliver a message received by wireless telegraphy. The aerial will be noticed by the side of the portable receiving station.

(2) MAP STUDY. To read a map quickly and accurately is a necessary accomplishment of a despatch rider.

(3) TUNING UP. To know an engine "inside out" is, of course, most essential. Breakdowns on the road which defy a practical despatch rider's ingenuity to repair are rare.

(4) SCOUTING OPERATIONS. This training is obviously more desirable when open warfare is the rule.

(5) A signal station and its attendant despatch riders ready at a moment's notice to carry messages.

The Work and Training of a Despatch Rider.—

amount of difficulty or danger has ever checked the energy and ardour which has distinguished their Corps throughout the operations."

During the winter of 1914, when the fighting was becoming more stationary, the work of keeping in touch between units became correspondingly easier. Telephone wires could be laid down, and the despatch riders relieved of their most difficult duty. Their main work now was to form a regular motor cyclist post which went round all units in the division every morning and evening. Those who had been through the first stirring months of the war began to find the work monotonous. The urgent need for their services no longer existed, and many of the motor cyclists applied for and obtained commissions.

Leaving camp for manœuvres. Observe the treacherous state of the road surface.

But though despatch riding has lost much of its excitement owing to the stationary conditions of warfare, these conditions are not likely to last indefinitely, and with the Army once more on the move, the work of keeping touch between units on the march will again fall mainly to the despatch riders. Consequently there is just the same need now as at the outbreak of war for choosing the right stamp of man for the work, and advantage is being taken of the opportunity of giving despatch riders a thorough training before they go abroad.

Selecting a Despatch Rider.

In the early part of the war, the Motor Cyclists' Reserve Committee did excellent work in obtaining recruits of the right type. Now, when a man wishes to join the motor cyclists he applies to the Commandant of the Signal Service Training Centre and fills up a form stating:

( ) Age.
(b) Motoring and motor cycling experience.
(c) Workshop experience.
(d) Where educated and what standard of education has been reached.
(e) Employment in civil life.

If he seems to be a suitable candidate he is put through a practical and theoretical test at a depot of the Signal Service Training Centre. The test includes the following:

(a) Personal interview.
(b) Riding test on at least two makes of machines, for preference the most difficult to handle. This test is usually very severe and over bad roads or rough country.
(c) A practical test in the shops diagnosing faults in machines.
(d) A written examination on "The Theory of Petrol Engines and Magnetos."
(e) Horse riding and management, both practical and theoretical if possible.

If he passes these tests satisfactorily and shows "keenness" and "initiative," he is accepted for training—that is, provided he is thoroughly fit and possesses good eyesight.

Men from eighteen to twenty-five years of age are the most suitable; men over thirty are not usually as good as younger men, and are said quickly to deteriorate. They should be intelligent, well educated (if possible, linguists), and possess plenty of dash and initiative. They should have had a thoroughly practical motor cycling experience on medium-powered machines, and be able to ride really well, and should thoroughly understand the working of their mounts.

At the depot a new recruit is put through three weeks' preliminary training; consisting of foot drill and a course of revolver shooting. (It is far more difficult to shoot well with a revolver than anyone who has not attempted it would suppose.)

A despatch rider frequently outpaces the telephone in short distances, getting there and back with his message before the telephone wire can be laid.

After that he starts on a course of training divided into six periods of a week each. At the end of each week the man has to qualify to pass on to the next week's training. If he fail to qualify in any one week he is put back and made to do that week's work a second time. The *first* week includes nine hours' care and cleaning of motor cycles, six and a half hours' "route march" on the machines, each man reading and being guided solely by the map, and leading in turn. A day and a half is spent on a scheme of field operations, and lectures on various subjects, *e.g.*, discipline, map reading, the principle of the petrol engine, the organisation of the Army, etc. The *second* week includes seven and a half hours' care and cleaning

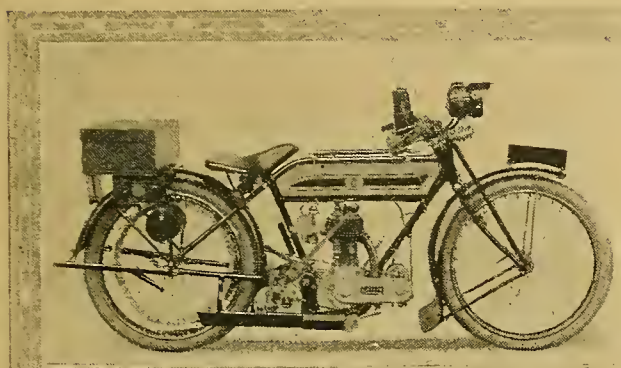
The Work and Training of a Despatch Rider.—

of machines, a day on a Point* Scheme, a day and a half on a scheme of field operations, and lectures on roadside repairs, map reading, duties of a despatch rider, etc. The *third* week is mainly occupied in dismantling and assembling machines and effecting minor repairs. The *fourth* and *fifth* include a scheme of field operations. a point scheme, and more advanced lectures on duties of N.C.O.'s, office work, hygiene, etc. The *sixth* week is devoted to riding, stable duties, and lectures on management of horses and mules.

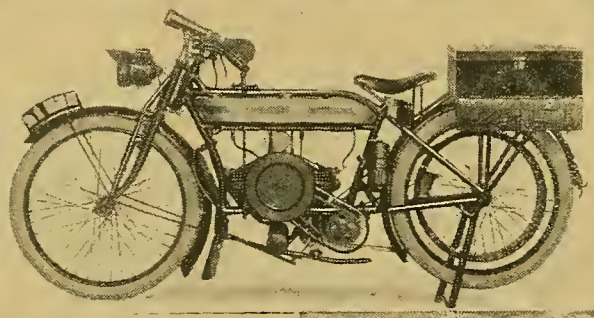
Any trained men who have shown that they are likely to become good mechanics are put in the workshops for a course, varying from one to three months, and when proficient in all motor cycle repair work are sent Overseas as "artificer corporals." Such men must be capable of heavy repair, lathe work, etc.

With regard to the type of motor cycle used, during training the men have all kinds of machines, but every R.E. draft that goes out to the Front is equipped with new motor cycles complete, either

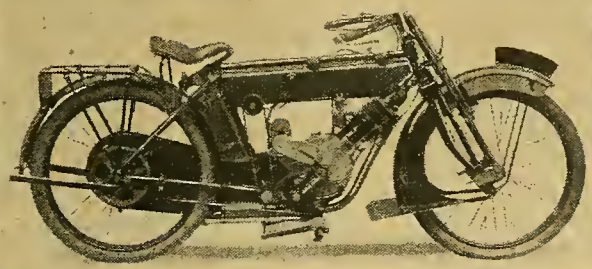
TYPES OF MOTOR CYCLES USED BY DESPATCH RIDERS OF THE BRITISH ARMY.



4 h.p. Triumph, 85 × 97 mm = 550 c.c., three-speed gear chain and belt drive.



2¾ h.p. Douglas, 60.5 × 60 mm. = 345 c.c., three-speed gear, chain and belt drive.



3½ h.p. P. and M., 85 × 88 mm. = 499 c.c., two-speed gear, enclosed chain drive. This mount is used by the Royal Flying Corps.

After this six weeks' course a despatch rider should be proficient in:

(a) Care of his machine or horse.

(b) Map reading and committing routes to memory.

(c) Riding or driving a car, motor cycle, or horse.

(d) Ordinary mechanical repairs to petrol engines and magnetos.

(e) General knowledge of Army work.

He is by this time thoroughly fit and well disciplined.

Ingrained into the successful despatch rider is the first duty to deliver his message *somehow*, and this is the whole object of the course.

Ready for the Fighting Front.

After the six weeks' course the man is fit to proceed Overseas. If he is not immediately required for draft he continues his training, which includes:

(1.) Marching and physical drill. Each man to walk fully fifty miles per week.
(2.) Linesman's duties.
(3.) Signal office work.
(4.) Army organisation in detail.
(5.) Faults on machines and in magnetos.
(6.) Theory of petrol engines and magnetos.
(7.) The duties of an N.C.O. and his responsibilities.
(8.) Map reading and outdoor schemes.

* A point scheme is mainly a practice in map reading. The man is given a number of points, either map references or noticeable marks, through which he is to pass. At certain of the points an officer or N.C.O. is stationed to note the time of arrival, which should correspond with an average of 15 m.p.h.

Triumph or Douglas. The result of this systematic training, evolved during the war from experience gained in the field, has been a great improvement in the efficiency of despatch riders. They are fully prepared for all the emergencies on Active Service, and they have a high tradition set by the first volunteers who came forward to meet a critical situation and handled it so successfully.

"CAUTION—DRIVE SLOWER-LY."

"The motorist of to-day is beset with a variety of restrictions, such as low quality petrol at high price, impossibility of getting spares and replacements, necessity of supporting the State by a loan of money, horrible state of necessity owing to which he can scarcely support himself, and many other difficulties too numerous, etc. At such a time it is as well to remind him that he can considerably reduce expenses by doing the same with speed. The quicker he goes about going about less quickly the better.

"It is the pace that kills."
It leads to colds and chills;
It helps the sale of pills,
Inducing aches and ills.
It's dangerous down hills;
Increases risk of spills;
Swells up repairers' bills;
Reduces cash in tills.
The "early grave" it fills;
Gives lawyers work on wills.
Although with joy it thrills,
"It is the pace that kills"—
Drive slower-ly.

—ARBUTUS.

Angleterre—Après la Somme.

How Two Officers Home on Leave, lured by the Call of the Road, converted a Five-year-old Single into a (somewhat precarious) Sidecar Outfit.

ONCE more has a benevolent Government given me ten days' "short leave," and once more have I visited the freak hills of peace time and the haunts of my youth. Once more, now, am I in the jolting train which is taking me to the disreputable roads of La Belle France.

But I have not been idle, in these few days, not by any means. An old and enthusiastic friend of mine, one John Timothy, R.N., has been on leave from the animated torpedo in which he appears to dwell, and such time as was not granted him by the lady of his heart we have spent in lurid motor cycling—and the like.

My ancient 'bus, luxuriating in rust most indescribable, was unearthed from the motor shed, and presented to the light of day. The larger surfaces of rust were then attended to—'ammer and cold chisel creating a remarkable change—and a gallon of petrol was obtained from the local vicar.

A large drum of paraffin—not a word!—was discovered in the cellar of the Timothy family, and was removed under cover of night. Carbide and oil were purchased at exorbitant prices, and the machine was ready for use.

Unearthing a Sidecar.

But one motor cycle between two is a most uncomfortable affair, especially when the roads are greasy and the tyres are three years old. John Timothy, also, was of the opinion that a little sidecarring would produce excellent results in the matter of the lady of his heart. So we searched the motor shed once more and discovered the remains of a wickerwork affair with sharp spikes and a wheel. Timothy swore it was a sidecar, and induced me to attempt to tie it to the machine.

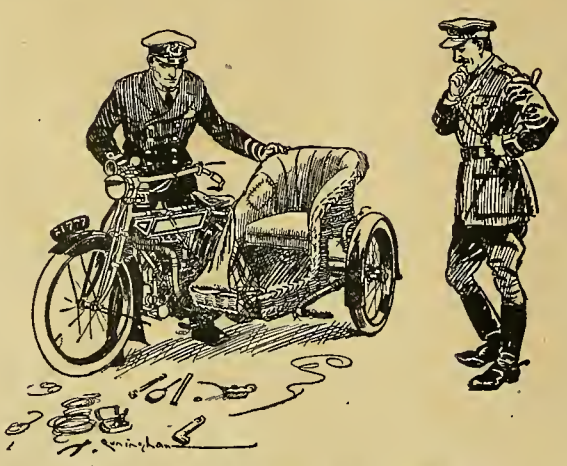
We had an argument, of course, before we came to this wild decision. I pointed out at the start that to take any girl (especially the girl with whom things are not *quite* "fixed up") for a "ride" in a contraption of this sort was madness. Complete estrangement, not to mention damage, summonses, or doctor's fees, could be the only result, and it would be better and cheaper, I urged, to hire a taxi for any joy-riding that was required. But John Timothy, when once his mind is set, will listen to no advice. He had decided to take "Lena" a run in this sidecar machine, or die in the attempt. "Lena," I suggested, might have something to say in the matter, but he did not see the point, and smote the vice with the 'ammer with such force and determination that the vice broke! I saw, then, that it would be cheaper for me to let him have his own way—and as soon as possible—so the attachment was hauled out, and a *post-mortem* held.

The sidecar was, of course, devoid of all couplings, but Timothy was not concerned. His life's motto is this, "What can't be done with 'eavy 'ammer, cold chisel, and copper wire, ain't worth doing!" So he bought fourpennyworth of copper wire, and started on the mighty work.

The Question of Attachment.

It was not, when finished, a pretty-looking job, nor a particularly secure one. But it certainly "held" all right, as a four-mile trip we had together proved. The strength of the couplings, of course, was due to Timothy's remarkable skill in twisting wire. Some of his methods are, in my opinion, extremely crude; his driving, at times, is beyond description; but when it comes to twisting copper wire, I take off my hat to him. Only by years of practice has he acquired the art; no other man have I met who can twist copper wire as tightly as he, and so that it *just doesn't* break. He is the Expert, and the Pioneer in quite a new method of sidecar attachment.

You will be expecting to hear now that Timothy met his lady love and threw her into the back of a brewer's dray. But, so far as I can make out, the run they had next day was entirely satisfactory. I waited for him, at any rate, at the "King's Head"—we had arranged a music hall together—from 7.15 till eight o'clock. Then he arrived in a great hurry, full of apologies and "puncture" explanations, and said he *really couldn't* come. But would I meet him at midnight in the "front room" of his house and come for a "run" then? ("Lena," it appeared, was free for the evening, and consequently he was not!)



"It was not, when finished, a pretty-looking job."

I visited Timothy at twelve o'clock to the stroke, but there was no light in the appointed window and no signs of life in the house. I tapped on the window gently and waited for the results. Nothing happened. I waited longer, and swore silently, for I was getting

a little "fed up" with Timothy and his erratic ways. (I did not ring, for Mrs. Timothy, senior, was much averse to midnight visitors, and had already informed me so at 250 words per minute.) Finally, I decided to slip round to the back and see if there were a light in his bedroom window.

Wakening Timothy.

There was. And, what was more to the point, there was a shadow on the blind—a form sitting in a crouched, huddled position, without a sign of life or movement!

No, there was no murder! Timothy, having—"officially"—retired to bed, had fallen asleep at the table, whilst waiting for midnight to arrive.

I threw up a handful of small pebbles without result. Then I threw up some big ones and nearly broke the glass. But he was fast asleep, and minor noises of this description had no effect.

Now Timothy's window is on the first floor of the house, and just above the slanting roof of the outhouses and cycle shed. I was determined to wake him somehow, if only to acquaint him of his misdeeds. So I rolled the garden roller against the outhouse wall, climbed up it, and started crawling across the roof.

Halfway up I slipped and slid violently back to the guttering. The noise of this performance woke the dog, and Timothy's dog, once waked, takes some stopping. It barked with the revolutions of a "big single" and the noise of an eight-horse Brooklands twin. And, of course, it woke everybody in the house except Timothy.

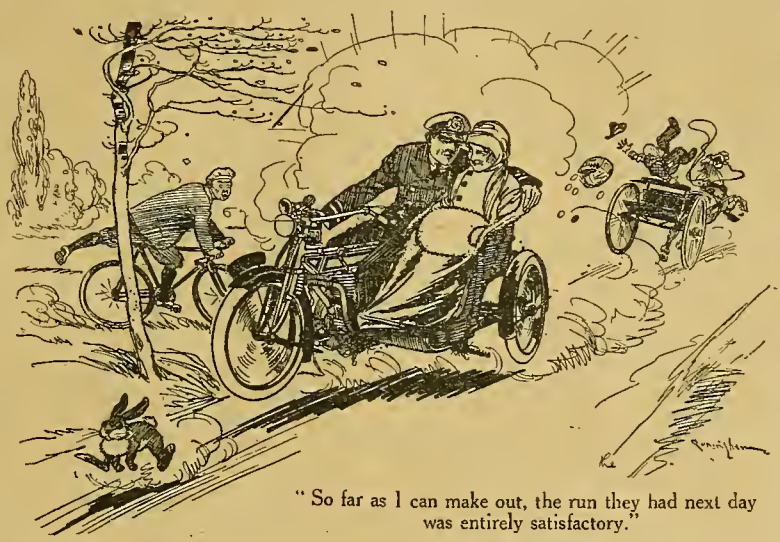
I might have slipped down and run, but I was determined to do or die. So I crawled up the roof again, and lay, as flat and as near the wall as I could, under Timothy's window. And still the idiot slept.

Presently, however, the window above Timothy's went up with a bang, and I observed, as George Robey did, "a fair female form at her window." She leant out and said "Who's there?" in a very severe voice. Then she said again, "It's no use, I can see you. Who is it?" Heavens be praised—'twas Tim's youngest sister.

"It's me, May," I said, "for goodness sake go and wake Tim. I've been banging away here for ages."

"Righto!" she cried, "but get out of the place as soon as you can and meet him at the corner of the road. Mother will be down in a minute."

The warning had come too late. I slid down the roof, and jumped gracefully on to the garden lawn—right into the arms of Mrs. Tim, senior.



"So far as I can make out, the run they had next day was entirely satisfactory."

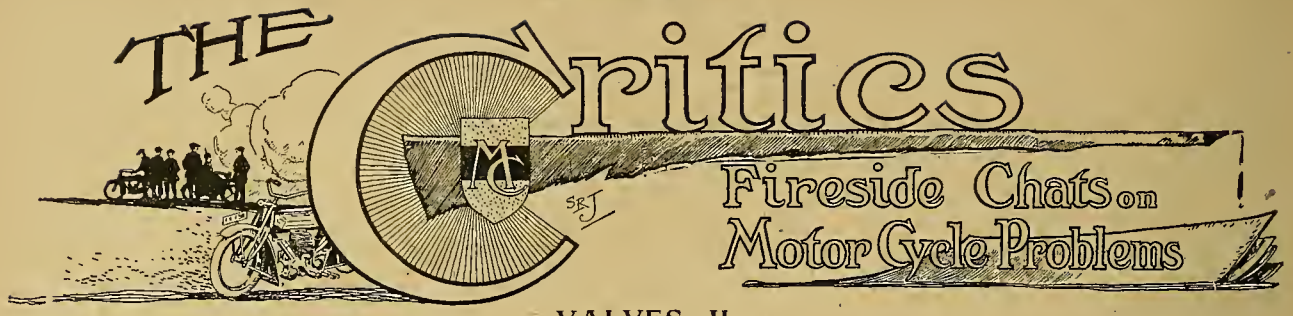
There are times at which a man—even an R.E. "loot"—does not look his best. I will not describe that scene.

Ten minutes later I met Tim at the corner of the road. He was very apologetic and reproachful, but it was the last night for both of us, and little family troubles cannot be allowed to stand between motor cyclists' friendship. So we primed the old 'bus and went for a midnight hill-climbing trip round the streets of Birmingham. Great Charles Street, Hill Street, and Bull Ring presented no difficulties to the five-year-old, single-geared outfit. But on Gough Street we met our Waterloo. There is a sharp right-angled corner at the bottom of Gough Street; the gradient is 1 in 7. The first time we stopped with a few dismal "conks." The second time we came round the corner so fast that the sidecar parted company with the machine, and we ourselves were cast head over heels into the gutter. We left the "sidecar" where it was, and both went home on the bicycle.

It is a strenuous thing this leave. 'Twill be close on a fortnight before we are really fit for serious work again.

G.D.

The humorous sketch reproduced is extracted from a double page of drawings by Jean Router in the new French fortnightly publication, *L'Automobile aux Armees*. The artist has, with a few strokes of the pen, good-naturedly caricatured our despatch riders and military police.



VALVES. II.

THE D.R. turned to the Journalist, "You argue that overhead valves do not break in these days," he said. "If that be so, how is it that even side-by-side valves so often snap off close to the head? If side-by-side valves cannot be made to stand up in an ordinary, flabby, touring engine, it is difficult to believe that the overhead type in engines of high efficiency is unbreakable."

The Journalist thought that the question was easily answered. "The breakage of the side-by-side variety is due to the extra inertia of the longer and heavier stem," he explained. "When the valve clatters on to its seat the whole of the inertia stresses fall under the head, a point weakened by the heat of the burnt gases, and so breakage occurs."

"But the weight of the stem is slight compared with the force exerted by the spring," argued the D.R. "Surely it is the strength of the spring which decides whether or not the valve will break?"

The Journalist shook his head. "The spring is the cause of the inertia, but it is the suddenness with which the valve is stopped that causes the stem to break."

"Then," queried the Novice, "why not make valves much stronger?"

"You can make them as strong as you like," put in the Manufacturer, "but the valve must close with a certain velocity in order to do its work. Therefore, the heavier the valve the stronger must be the spring, and the breaking strain is in proportion. If you could use a very light metal, or even if you could design a valve with a tapered stem—thick at the top, thin at the bottom—the likelihood of breakage could be reduced to nil."

Other Types of Valves.

"When one comes to think of it," mused the Journalist, "the ordinary poppet valve is a most malicious and inefficient thing. It is noisy, it requires constant attention, and it must break sooner or later. A decent sleeve, rotary, or piston valve mechanism would improve the motor cycle engine enormously, and it is a surprising thing to me that so few serious experiments have been made with air-cooled sleeve valve engines."

"Were not the Daimler Co. experimenting with a sleeve valve motor cycle engine some little time ago?" queried the D.R.

"Yes," replied the Manufacturer, "they did make certain experiments, but we have no knowledge that they ever intended to produce a motor cycle engine commercially."

"In which case, why did they experiment?" queried the Journalist.

The Manufacturer said that it was always a good thing to find the limitations of a new idea, which can only be done by experiment. "The Daimler engine under discussion was subjected to a most searching test—a test which few air-cooled engines of that day would have stood up to—but the makers did not seem entirely satisfied with it. It may simply have been tested in its air-cooled form to prove the efficiency or otherwise of the lubrication of the sleeves."

Car Practice.

"In the car world the poppet valve is seriously rivalled," observed the Journalist. "Anyone who has driven a sleeve valve car knows what a delightful system it is, and its advantages would be even more fully realised on a motor cycle. Therefore, it is an extraordinary thing that rotary and sleeve valves have not been more grimly tackled."

"Lubrication is, of course, the fly in the ointment," said the Manufacturer. "In the case of an air-cooled engine lubrication is more important than in the case of a comparatively cool running car engine. Just imagine a rotating valve on the cylinder head of a motor cycle engine! How are you going to keep it oiled? Why, the heat would be sufficient to flash off the oil immediately it came in contact with the friction surfaces. Rapid wear would be impossible to avoid, and it must be borne in mind that a rotary valve, or any other type, must be a beautifully machined fit, and, moreover, it must work perfectly freely. These points you cannot obtain when the gastight joints and friction surfaces are exposed to immense heat. Then there is another point. You've got to remember that the pressure is always on one side of such valves, and that they have to *open* under pressure. This means that a fair amount of friction is inevitable."

"I agree with that entirely," said the Journalist. "Lubrication is the only real stumbling-block, and if, as you say, petroil were employed, and the whole engine kept flooded with lubricant, the rotary valve might survive. But such a system would be wasteful and objectionable in many ways. Yet you want to bear in mind that in the early days of the sleeve valve car engine everyone said that difficulties of lubrication would stand in the way of its development. All the wiseacres said that the sleeve would stick or seize or something. These difficulties were overcome, however, and doubtless the more obvious difficulties in the case of the air-cooled engine could be overcome by experiment and perseverance."

"Personally I am not very keen on the systems," stated the D.R. "Such an engine would be beautifully silent, wonderfully reliable, and require jolly little adjustment, but owing to the increased internal friction it would possess nothing like the vitality of a poppet valve engine. With a car engine slightly increased friction does not matter much."

"That does not apply in the case of such systems as the Argyll rotary sleeve," argued the Manufacturer. "This is the only sleeve valve car that has broken records at Brooklands."

The Journalist agreed; in his opinion there would be very little difference as regards friction between the two systems. In fact, a properly designed rotary or piston valve might be made to work with very much less friction than a poppet valve mechanism. "But," said the Journalist, "it seems to me that lubrication presents much greater difficulties in the case of the rotary or piston valve operating *outside* the cylinder than in the case of a sleeve valve working inside the cylinder. The outside valve must be kept flooded with oil on account of its high temperature, which would inevitably mean an oily combustion chamber and plug troubles. Unless it were kept flooded it would dry up, because the pressure inside the cylinder would tend to force the lubrication away from the friction surfaces."

Valves, Types of.

"That may apply in the case of the rotary valve," said the Manufacturer, "but it does not apply in the case of a piston valve. This latter type is as easy to oil as the piston of an engine, but still I do not think that it is particularly applicable to motor cycle engines. In point of fact, the whole thing boils down to this. We have adopted the poppet valve because it is the only type of valve which will work without lubrication at high temperatures and high speeds. The other types of valves you name may appear to have enormous advantages, but, believe me, their disadvantages would be equally great. Are you going to have noise, occasional adjustment, and a type of valve which can be renewed in a few minutes, or are you going to have a type of valve which, though silent, will land you hopelessly if anything goes wrong with it, while its reliability will depend entirely upon perfect lubrication? No, the poppet valve may, in time, be superseded, but not just yet."

At this juncture it was discovered that the Novice had disappeared; it was observed that his original open-mouthed interest had changed to a bored expression. The terms piston valve, rotary valve, were beyond him, but, not to be outdone, he returned in a few moments with a technical handbook, and feverishly searched its index for "Valves, Types of." He is a wiser man now!

Further Testimony from Motor Cyclists in German East Africa.

The experience of the South African Motor Cyclist Corps mounted on 400 B.S.A. Motor Bicycles is further described by Capt. F. J. Ashley, Chaplain of the Force. Writing of the rough usage which the B.S.A. machines had to undergo, he says:—

"Fair play and justice demand that you should be acquainted of the wonderful performances of your machines and the credit they have earned for you. It has often been amusing to hear the men dilate upon the achievements of their individual machines, and pit them one against the other, because when we started, the opinions as to what they would do were very diverse, only a few having ridden B.S.A's. But it only needed time and experience to change aversion or indifference into first respect and then enthusiasm, and if there be those who from various reasons will return to former mounts there is not one but has the greatest faith in the B.S.A. for being foolproof, unbreakable and reliable."

B.S.A.
MOTOR BICYCLES

For Solo and Sidecar.

Catalogue Free.

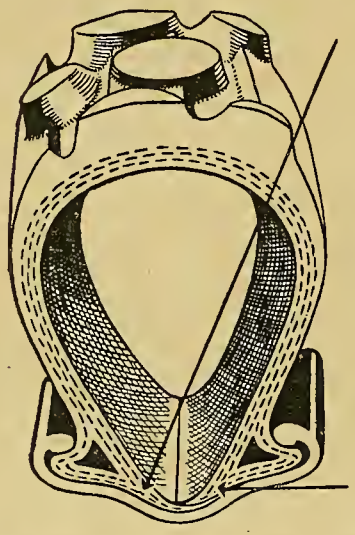
THE BIRMINGHAM SMALL ARMS COMPANY LIMITED,
47, Small Heath, Birmingham.

Why Dunlops?

DUNLOP TYRES ARE MADE BY AND FOR PRACTICAL RIDERS.

No guess-work will suit the rider of to-day in the matter of RIM FITS.

Note a few **DUNLOP** *features*



The WIDE FLAP on one bead—covers the spoke nipples—stops water leaking through spoke holes.

Being punched for the valve, the wide flap prevents creeping

Being extremely supple and feather edged, this wide flap means easy fitting and no jamming of opposite bead.

The tube has a perfect BED on the exactly shaped Dunlop bead flaps.

The NARROW FLAP means easy fitting.

It means NO NIPPING, you can't jam the tube below this narrow flap.
It means EASY DETACHING because the narrow bead flap lets you get at the tube at once.
This narrow flap is stiff and can't be buckled and thus prevented from coming under the clinch.

DUNLOP MOTOR-CYCLE TYRES DON'T HAVE BEADS LIKE THESE:

Both beads too short.
Result—{Non-water-tight. Nipped tube.

Short flap too long.
Edges of bead flaps too blunt.
Result—Nipped tube.

DUNLOP RUBBER CO., LTD.,
FOUNDERS OF THE PNEUMATIC TYRE INDUSTRY.
PARA MILLS, ASTON CROSS, BIRMINGHAM.
OF ALL CYCLE AND MOTOR-CYCLE AGENTS.

One Power Stroke per Revolution.

A Double-acting Four-stroke Engine having Concentric Valves.

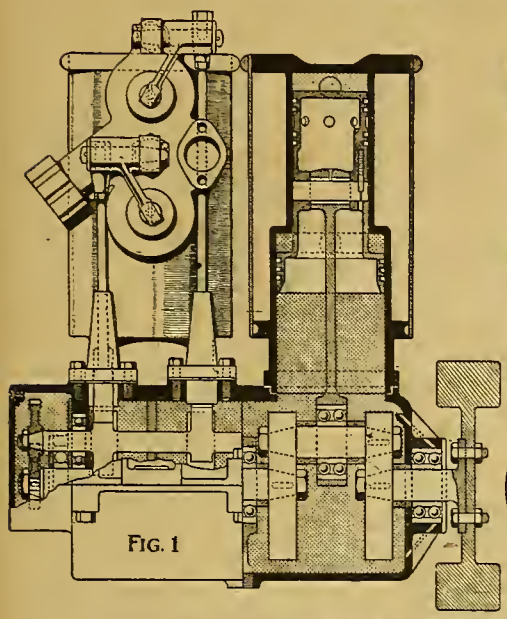


FIG. 1

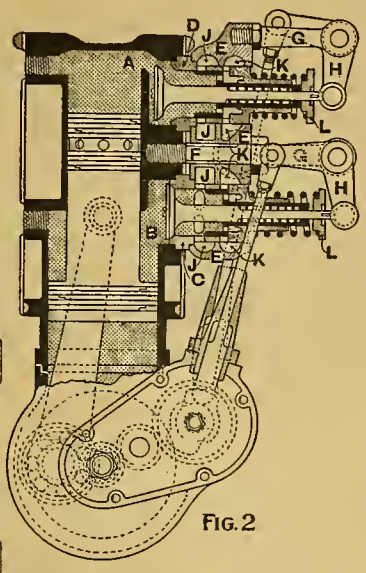


FIG. 2

A double-acting four-stroke engine patented by L. S. Parker in 1910. By the means described, one power stroke per revolution is obtained.

ORIGINAL engine designs are always instructive, but, in view of the publicity recently given to concentric valve systems in the pages of *The Motor Cycle*, and the interest shown by our readers in this question, the engine designed and patented by Mr. L. S. Parker in 1910 should prove more than usually attractive to students of design.

The Parker engine is designed to give one impulse per revolution, and this is achieved by constructing the piston and cylinder with two different diameters, forming an annulus or shoulder on the piston, which acts as a secondary piston on the same axis, and thus two separate compartments are formed in the cylinder. The explosion is arranged to take place alternately in each compartment.

The engine is a double-acting four-stroke; that is to say, in each separate compartment of the cylinder there are consecutive suction, compression, explosion, and exhaust strokes, the valve mechanism serving to control these operations for both compartments of the cylinder.

The effective areas of the end of the smaller part of the piston and that of the annular shoulder of the larger part are made equal, so that an equivalent impulse is obtained on each part of the piston.

In the engine shown there are two double acting cylinders, but there may be any desired number.

The Valve Mechanism.

Each cylinder is provided with main ports A and B, these ports being fitted with fixed casings C and D, which are held in position against their bored out seatings by the yoke piece E. This yoke piece embraces both casings and is centrally held to the body of the cylinder by, preferably, a single bolt F. Such a construction gives considerable accessibility to the valves, since by merely releasing the bolt F the yoke piece with the casings may be bodily detached for inspection. The yoke piece E carries the screwed brackets G, to the outer ends of which are pivoted the bell cranks H, the depending arms of these bell cranks engaging the outer ends of the valve spindles of the main valves, which control the outlets from the casings into the main ports A and B opening into the cylinder compartments. The valve spindles slide axially within the tubular shanks of movable sleeves, which are themselves adapted to slide within the fixed casings C and D. The fixed casings are each provided with exhaust ports J and inlet ports K, the movable sleeves being also provided with holes adapted, when the movable sleeves are in the position of the upper valve gear shown in fig. 2 to put the cylinder compartments into communication with the inlet ports K. When a main valve is lifted from its seating by the bell crank arm H, the extension of the cylindrical movable sleeve is in a position which opens the exhaust port. The movable sleeve thus acts as a slide valve controlling the inlet and exhaust ports and is subsidiary to the main valve.

Two-step Cams.

The cam is provided with two circumferential steps of different radial depth, and as the cam rotates the action of the lower step is to lift the main valve partially off its seating, this action being timed to take place when the exhaust stroke should commence. The same movement of cam and the bell crank H, which has thus partially lifted the valve, has brought the collar L against the end of the sleeve and the exhaust is now open. Further rotation of the cam brings the higher step into action, thus opening the valve still further and causing the movable sleeve to shut off the exhaust port and open the inlet, as shown in the upper part of fig. 2. The cam then permits the main valve and sleeve to be returned to the closed position shown in the lower part of fig. 2.

Lack of balance and the difficulty of lubricating the piston seem to be the chief drawbacks of this design.

AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the figures for the preceding five weeks. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.J.S.	1916	6 combination	—	£96
„	1914	6 combination	£55	£56
„	1916	4 combination	—	£85
Allon	1916	2¾ 2-speed	—	£32
„	1914	2¾ 2-speed	—	£28
Ariel	1915	3½ 3-speed	—	£44
„	1914	5-6 combination	£45	£55
Bat	1914	6 3-speed	£48	£48
Bradbury	1914	4 2-sp. sidecar	—	£43
Brough	1916	3½ 2-speed	—	£57
„	1915	3½ 2-speed	£46	£45
B.S.A.	1916	4½ sidecar	£55	£60
„	1915	4½ sidecar	—	£56
Calthorpe	1916	2¼ 2-speed	—	£34
„	1915	2¾ 2-speed	£25	£24
„	1916	2½ 2-stroke	£29	£28
Clyno	1915	2½ 2-stroke	—	£28
„	1914	6 combination	—	£65
Douglas	1916	2¼ 2-speed	£43	£48
„	1915	2¾ 2-speed	£42	£45
„	1914	2¾ 2-speed	£36	£35
Enfield	1916	6 combination	£77	£78
„	1915	6 combination	—	£61
„	1916	3 2-speed	—	£45
Excelsior	1915	8 2-speed	£48	—
H.-Davidson	1916	7 combination	£85	£77
„	1915	7 combination	£70	£66
Henderson	1916	7 combination	—	£100
Hazlewood	1914	6 3-speed	—	£39
Humber	1915	6 combination	—	£65
Indian	1916	5 combination	£54	£61
„	1916	7-9 combination	£72	£80
„	1915	7-9 combination	£62	£65
James	1916	4¼ combination	£65	£64
„	1916	2-sp. 2-stroke	—	£32
Levis	1916	2¼ Popular	£25	£24
„	1915	2¼ Popular	£22	£21
Matchless	1915	7 combination	—	£74
New Hudson	1916	2-stroke 2-sp.	—	£28
„	1915	4 combination	—	£48
New Imperial	1916	2½ 2-speed	£34	£29
„	1915	2½ 2-speed	£26	£23
Norton	1916	3½ 2-speed	—	£47
„	1915	3½ T.T.	—	£45
O.K.	1916	2¼ 2-stroke	£22	£22
P. & M.	1915	3½ combination	—	£65
„	1914	3½ combination	—	£55
Premier	1915	2¼ 3-speed	—	£28
„	1914	3½ 3-speed	£49	£45
Rover	1916	3½ 3-speed	£55	£49
Royal Ruby	1916	2¾ 2-stroke	£28	£28
Rudge	1916	3½ Multi	—	£44
„	1915	3½ Multi	—	£40
Scott	1916	3¼ combination	—	£60
Sun	1915	2¼ 2-speed	£24	—
Sunbeam	1916	8 combination	—	£110
„	1916	3½ solo	£68	£72
„	1915	3½ combination	£80	£77
Triumph	1916	2-sp. 2-stroke	—	£39
„	1915	4 countershaft	—	£53
Zenith	1915	8 Gradua	—	£62

TIMES TO LIGHT LAMPS.

SUMMER TIME.

May 24th	...	...	9.25 p.m.
,, 26th	...	...	9.28 ,,
,, 28th	...	...	9.30 ,,
,, 30th	...	...	9.32 ,,

Volunteers at Blackpool.

It is expected that at least eight Volunteer Sections will take part in the general gathering of Volunteer Motor Cyclists at Blackpool on the 3rd prox. The provisional programme appears in this issue.

No Petrol for Sale.

We have noticed that one or two garages having large stocks of substitutes on their hands show a certain reluctance to part with their petrol. "No, sir; we can let you have a gallon of substitute if you like." And a very good wheeze, too!

Tarring over the Pot-holes.

Once again the battered roads are receiving their christening of tar—in some cases without any attempt to fill up the pot-holes. We suppose this is the best that can be done, but by rendering such a surface waterproof it is merely made to retain its surface water longer. Query, are puddles preferable to dust?

Women Despatch Riders.

Lady motor-cyclists who are anxious to do national work should apply to the Women's Legion, Motor Section, Devonshire House, London, W. Candidates should ask for a form of application, on which rates of pay and particulars of service are stated. They will mostly be employed as despatch carriers.

The first lady motor cyclist we have seen in R.F.C. uniform was driving an R.F.C. model P. and M. down Pall Mall on Thursday afternoon last.

The Early History of the Motor Cycle.

A French lieutenant, who must be of the modern school, writing in *L'Automobile aux Armées*, a French fortnightly journal edited at the Front, says of the motor bicycle that Wolfmüller's machine was made about 1894, and that about the same time the Werner made its appearance. The fact is that the first motor bicycle was Daimler's in 1885, followed by the Wolfmüller, 1892; the Werner, with engine on steering forks, being offered in this country about 1899. Of French motor bicycles, the De Dion Bouton Co. probably made one of the earliest, as an experiment, about 1896.

The earliest motor bicycle with two-speed gear and chain drive was the Chappelle, a French design.

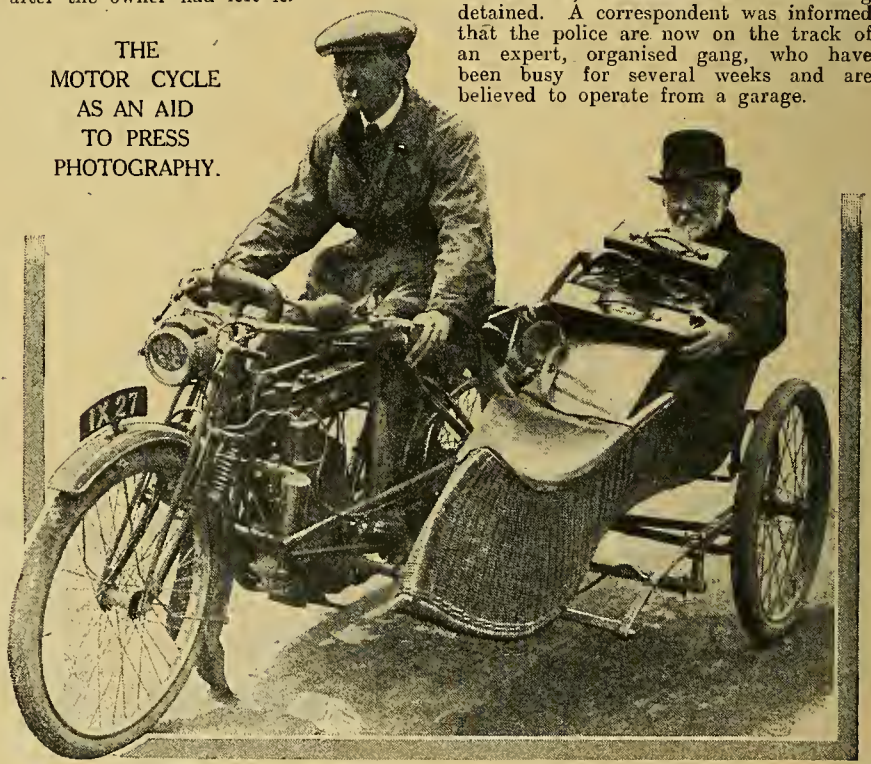
English-French Motor Terms.

In view of our many readers in France, a glossary of English-French terms relating to motor vehicles should be of particular value just now. No less than nine pages of "Motor Cycles and How to Manage Them" are devoted to an English-French glossary of motor terms.

A Smart Capture.

A motor cyclist named John Barnard recently left his machine in St. George's Square, Hoxton, close to where some men were working, and missing it two minutes afterwards he reported the matter at Old Street Police Station. As he was leaving the police station he saw a man in custody being brought in with the motor bicycle. The man, William Smith, was remanded at Old Street Police Court on a charge of stealing the machine, and it was explained that the constable, suspecting that he had no right to it, arrested him five minutes after the owner had left it.

THE MOTOR CYCLE AS AN AID TO PRESS PHOTOGRAPHY.



Press photographers returning from a function with a well-ladened sidecar. Mr. Thankfull Sturdee, of the *Daily Mirror*, the "father" of press camera users, is being driven by Mr. Frank A. Hardy, a well-known motor cycle journalist. By means of a motor cycle, exclusive pictures are frequently obtainable and more events covered than would be possible if one relied upon the train.

SPECIAL FEATURES.

THE WORK AND TRAINING OF A DESPATCH RIDER.

ANGLETERRE—APRES LA SOMME.

A £5 TIP.

Pooling of Interests.

A new committee, to be known as the Technical Committee of the Motor Industries, has been formed by the Institution of Automobile Engineers and the Society of Motor Manufacturers and Traders in order to co-ordinate the many technical questions which arise in connection with the automobile industry.

Missing Motor Cycles. Three Arrests.

Two men on a Douglas were arrested in the East End on Thursday and remanded. The machine has been identified as being stolen in South London a few days ago. Another arrest was made at Grove Park, the machine and rider being detained. A correspondent was informed that the police are now on the track of an expert, organised gang, who have been busy for several weeks and are believed to operate from a garage.

The National War Funds.

At the week-end the principal war funds stood as follow :

The National Relief Fund (distributed £3,608,015) ..	£6,117,417	0	0
British Red Cross Fund ..	6,611,802	18	7
Tobacco Fund	129,800	0	0

Is a Bath Chair a Motor Car?

The Divisional Court has decided that an electrically-propelled bath chair of ¼ h.p. and weighing 2¼ cwt. is a motor car, and is subject to motor car fees. Such an extraordinary decision is a reminder of the British Government's red flag rule which hindered the progress of motoring in the early days.

World-wide Trade.

The Overseas section will appear in the next issue of *The Motor Cycle*, dated May 31st, and in future in the *last* issue of each month, instead of the first as formerly. Motor cycling items of world-wide interest will be included. Signs are not wanting that the motor cycle trade, as a whole, is looking across the waters for expansion of sales. This is very gratifying, as this journal has fostered British trade Overseas for many years past, and our monthly Overseas supplements have been included since the beginning of 1914.

Sidecar Mudguard Attachment.

We are informed by Mr. V. A. Holroyd that several experiments were made with regard to the best method of attachment for the sidecar wheel mudguard on the latest Rudge sidecar, described in our issue of May 17th, before it was ultimately decided to support the mudguard from the frame carrying the body. In the first place, the guard was attached direct to the body; but it was found that in this position it was still very liable to shake adrift. The present arrangement is, we are told, entirely satisfactory. It has often occurred to us as rather unaccountable that the sidecar mudguard should travel as unsprung weight, ultimately becoming a source of mysterious rattles, when without difficulty it might just as well have the benefit of the body springing.

Petrol and the Daily Press again.

A certain section of the daily press is still hammering the drum to the detriment of the private motorist, and when on May 21st we noticed an article in *The Daily Mail*, entitled "Petrol Shortage," and bearing the startling sub-titles "Check on Licences" and "Round up of Private Hoards," we naturally expected something new. The only suggestion of novelty, however, was a list of highly speculative amends which may take place in the system of issuing petrol permits, and which, says *The Daily Mail*, will probably include "Powers of the police to ask motorists to produce their petrol licences, and to search for petrol hoards."

This is doubtless what *The Daily Mail* would love to see in effect, but there is no need to enlarge upon the absurdity of the suggestion that a motorist having a small private stock of petrol, legally obtained by the full sanction of the Petrol Control Committee, may be hauled up by the police for the possession of it, or for using it as his fancy dictates.

Another Stolen Machine.

W. F. Guiver, the well-known competition rider, who is at present working at Farnborough, has had the misfortune to have his 3½ h.p. Ariel, which he used at the last R.A.F. hill-climb, stolen. An award of £5 is being offered for its recovery by W. F. Guiver, 6, The Broadway, King's Road, Fleet, Hants.

Commonsense Magistrates.

At St. Helens Police Court a motorist was recently brought before the magistrates for driving a motor to the danger of the public and for failing to give audible warning of his approach. The case was dismissed, and a "Commonsense Magistrate," in a letter to the *St. Helens Newspaper and Advertiser*, sums up the circumstances as follows :

"As I happened to be in your salubrious town, and had some time to wait for a train connection, I looked in at the Police Court, and was particularly interested in a case of alleged failing to give audible warning of approach, and driving to the public danger, against the chief engineer of a local works. In all my experience I have never listened to such a trivial and unsubstantiated case. Just imagine, the only complainant, a police sergeant who was riding on the back of a tramcar coming in the opposite direction, a St. Heleus tramcar at that, saying he did not hear defendant sound his horn at the Lingholme corner, about forty yards away, and at the opposite end of the car to which the officer was. It would have been remarkable if he had! Then he admitted there were no pedestrians or vehicular traffic about at the time, and the only witness he called said he was not there, but about 250 yards away in Windleshaw Road. I take off my hat to the St. Helens magistrates, who stopped the case without calling upon the defendant's witnesses, and dismissed both cases."

A Double-acting Four-stroke.

Many readers will remember Mr. L. S. Parker, of Kendal, who regularly attended the North Country competitions of pre-war days. Some time ago he patented a double-acting four-stroke engine having concentric valves, and we are able to publish details and an illustration of the engine in this issue.

Taxis only for Hire.

Recent amendments to the Defence of the Realm Regulations read as follow :

"On and after 12th May, 1917, motor spirit shall not be used for the purpose of any motor car let for hire except where the letting of the car—

"*(a)* Is in connection with ambulance or hospital work or the conveyance of wounded soldiers, or is to a duly qualified medical practitioner for the purpose of his profession; or

"*(b)* Is in connection with naval and military or munition service or the conveyance of munition workers to and from their work; or

"*(c)* Is authorised by the Board of Trade for any special purpose, etc., etc.

"Nothing in this regulation shall apply to any motor cab or motor omnibus standing or plying for hire in any street or public place or in any railway station; but any question as to whether or not a car is exempt under this provision shall be referred to the Board of Trade, whose decision shall be conclusive."

TRENCHES AND REST BILLETS—REST BILLETS AND TRENCHES.

Our men at the Front occasionally get a well-deserved change. Scattered along the Front are various entertainment troupes which are appreciated immensely, as can well be imagined. The accompanying photographs were taken on the Western Front. "The Balmorals" entertainment troupe of a Scottish Division receive a request by motor cyclist despatch rider to give an entertainment. (*Official photograph.*)

AMBULANCE WORK NEAR THE "LINE."

In referring to Dvr. H. E. A. Chinn, in our issue of the 10th May, a remark may have been misunderstood, and we are urged to revert to the point. It was stated on Dvr. Chinn's information that the Section Sanitaire Anglaise worked nearest to the front line, but we are told that such is not continually the case. At times this section may be a little in advance of the British Ambulance Sections, but on other occasions the last-named men are in front of the Section Sanitaire Anglaise, so that there can be no distinction, for all go as near as they are allowed. Although these two ambulance sections are separate and distinct organisations, we are not surprised to hear that the best of friendship exists between the men.

MOTOR MACHINE GUN SERVICE.

As is well known, the Motor Machine Gun Service (concerning which section a great deal was heard in 1914 and 1915) has been absorbed by the Machine Gun Corps. Batteries of the old M.M.G.S. are scattered all over the world, and drafts are regularly being provided at the training centre for the sidecar batteries Overseas, as well as for the light armoured motor batteries (consisting of armoured cars of the Leyland and Rolls-Royce types and armed motor cyclists), which are frequently referred to in our "Military Notes" column. "The men at the training centre are still M.M.G. through and through, and proud of it," to quote the remark of a Battery Sgt.-Major. Dozens of the old motor cyclists of the M.M.G.S. have returned for commissions, and altogether the section has a very fine record. The photographs accompanying will prove of interest, particularly as a constant wail of M.M.G.S. men returning from Overseas is "that they seldom see their machine gun sidecars illustrated in *The Motor Cycle* now."

One of the illustrations is of a group of N.C.O.'s, nearly all men of the Battery which rendered such good work in the second battle of Ypres, for which service a number of the men were decorated, as reported in these columns at the time.

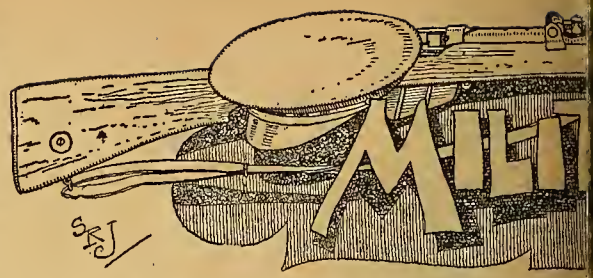
MOTOR CYCLIST-AIRMAN'S FATE.

Flight-Lt. A. E. TROLLOPE, killed in the recent double Yorkshire flying fatality, his passenger being an Australian officer, was a well-known Kent motor cyclist. He lived at Bromley and owned an Indian. He was a skilled pilot. During the funeral at Bromley two aeroplanes circled low over the cemetery and dropped flowers on the grave.

PRISONER OF WAR AT KARLSRUHE.

It will please our readers to know that Lt. Howard R. Davies, the Sunbeam rider, is safe. It was on April 26th that we announced that this intrepid motor cyclist-airman was missing, having failed to return from a flight over the German lines on the 14th ult. His fate was unknown until last week, although an unauthorised statement appeared in a contemporary to the effect that he was killed. As a matter of fact, the first news of his welfare, which reached his parents last week, came in a roundabout way. A cheque signed by H. R. Davies and dated April 24th, Karlsrühe, passed through a Ber branch and reached Messrs. Cox a Co.'s Bank towards the end of t week, and immediately a wire was f warded to the anxious parents of L Davies conveying the good tidings. a matter of fact, at the time of goi to press no news had been recei officially from the War Office, Davies's many friends are greatly lieved to know that he is alive, as worst was feared after the unfortu report referred to.

A group of motor machine gunners. Reading from the left, back row: Sgt. Bibby, Cpl. Roberts, M.M., Cpl. ———. Front row: Batt. Sgt.-Maj. Farquhar, Sgt. Langford, Batt. Sgt.-Maj. Harlow, Sgt. Harlow.

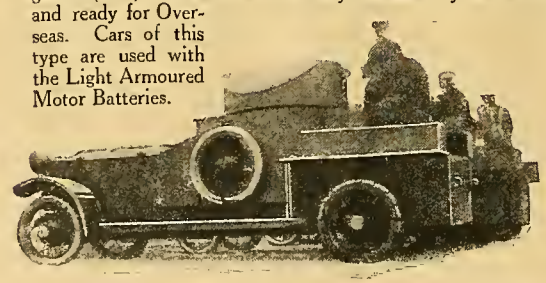


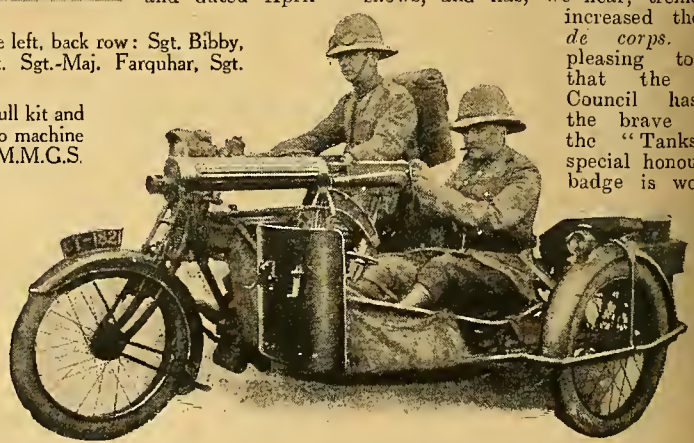
Men of the "Tanks" have been h shoulder. The design is worked in wh projecting from the sponson, black silk Heavy Section, M.G.C., is seen wearin

HONOUR FOR MEN OF TH "TANKS."

A DISTINCTIVE badge has been allotted to the men of Heavy Section, Machine Gun Co. who operate the "Tanks." It is attractive design, as our illustrat shows, and has, we hear, tremendou increased the *es de corps.* It pleasing to kn that the Ar Council has gi the brave men the "Tanks" special honour. badge is worked

Below. (Right) B.S.M. Farquhar and Q.M.S. Wilson in full kit and ready for Overseas. They are aboard one of the Vickers-Clyno machine guns. (Left) An armoured Rolls-Royce manned by men of the M.M.G.S. and ready for Overseas. Cars of this type are used with the Light Armoured Motor Batteries.





Notes

e silk, representing a Tank, with
k edging, a very useful looking
projecting through the sponson.
s worn on the right shoulder, and,
one of the men put it, "We have
sit sideways in trains and other
eyances in order to exhibit it."

THE NEW "TANK" BADGE.

nctive badge, to be worn on the right
it a "Tank," with a very useful gun
riving belt. Above an officer of the

pite the hundreds of photographs
ch have been published of "Tanks"
the past, there are still some who
not recognise the badge, and enquire
the wearers as to its meaning. The
n of the M.G.C. are full of wit, and
e of the answers would form inter-
ng reading.

A PARALLEL CASE.

EAR-ADMIRAL W. S. Sims, U.S.N., commanding the American destroyer force, was the hero of an glo-American incident. In 1909, when ting British waters in command of U.S. Battleship *Minnesota*, in the rse of a speech at the Guildhall, miral Sims declared that if Britain r found herself in real peril there was an officer or man in the United tes Navy who would not burn to ie to her aid. As the result of this ndiscretion" Germans and pro-Gerns in the United States attempted to ck Admiral Sims's marine career, but ed. This is curiously like the case the late Rear-Admiral Sir R. K. outhnot, who, at the A.C.U. dinner 1910, declared that the German Emor had been plotting against England r since he came to the throne. The ult of this "indiscretion" was that ing to the intervention of the German bassador the late Rear-Admiral was missed his ship and placed on half y (for a period).

ITALIAN D.R.s' AWARD.

THE appended reproductions are of photographs received from the Italian Front. They depict a quintette of despatch riders of our gallant Italian Allies—men of the 28th Division, whose Commandant has awarded the English medal (reproduced) to the detachment. In the course of a letter acknowledging the award the men say: "If the services of the Motor Cyclists' Section have been rendered in a way that deserve honours, it is due to a considerable extent to the quality of the Triumph, the solidity, commodity, and elegance of which it is our duty to proclaim sincerely."

THE CALL OF THE ROAD.

"BEING in far away Salonica, at present I do not have the pleasure of seeing *The Motor Cycle* regularly—more's the pity," so writes Driver A. A. Smith, A.S.C., and goes on to say:

"Where I am now motor cycles are very scarce, and the only one I see is a Douglas ridden by an officer.

"I am in the A.S.C., and so am mostly concerned with mule power locomotion; but oh! what joy it will be to get back and drag out my 2¾ h.p. Peco and sidecar, and hie-away into leafy Warwickshire with passenger. A good mate of mine, I hear, has had the jigger out and 'groomed' it, and I believe the thing is getting impatient for my return, which cannot be very long now, we all think. What glorious days those will be when peace comes and we are once more on the open road."

12,683 APPLICATIONS.

SINCE the commencement of the war *The Motor Cycle* has dealt with 12,683 applications for enlistment in one or other of the motor sections of the Army and Navy.

FROM THE TRENCHES.

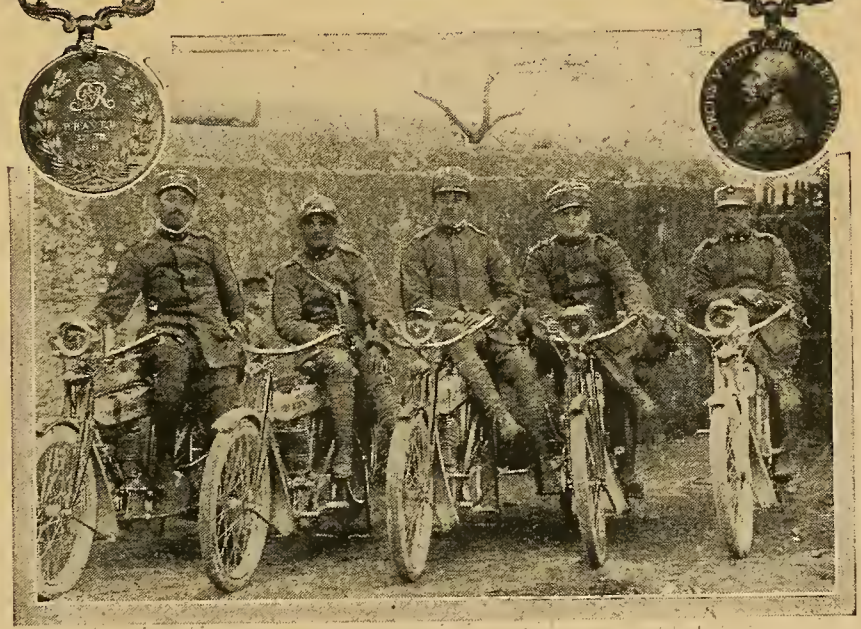
A WELL-KNOWN Liverpool motor cyclist, Lewis Mogridge, Sec.-Lt. 8th King's (Liverpool) Regiment, is at present in a Camberwell hospital recovering from a severe dose of trench fever, caught on the Somme, where he spent the winter months. Mogridge was a consistent performer in competitions, and rode a Rudge in the 1914 London-Exeter Run, 1914 Jarrott Cup Final, M.C.C. Brooklands Meeting, M.C.C. Devon Trials, and in all the open trials of the Liverpool A.C.C. and the Mersey Motor Club.

MILITARY MOTOR CYCLING IN THE UNITED STATES.

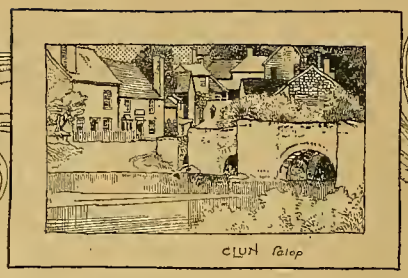
ALL through the American journals there are indications that Uncle Sam is taking the war seriously. Although the first armoured motor battery of the National Guard of New York has not yet been recognised by the War Department, it is going ahead with the purchase of additional equipment from funds subscribed by wealthy men. It is stated that the battery has purchased ten Lewis machine guns, and has received four new Colt automatic guns. The battery consists of three armoured cars, twenty-three cars, several lorries, eighty motor cycles, and six gun trailers.

At present motor cycles are recognised in the United States Army only in connection with the commissariat department, but we cannot suppose that this state of things is likely to continue.

ITALIAN DESPATCH RIDERS.



A group of despatch riders on the Italian Front. All of them ride Triumphs, of which they speak appreciatively. (Insets) The British medal awarded to the detachment for bravery in the field (see paragraph).



THE Incubus of the Sidecar.

By "Road Rider."

WE are just emerging from a prolonged controversy in which the adherents of the A.B.C. on one side and of the Norton on the other have been perhaps the leading protagonists. I desire now to draw attention to a heresy which both these firms share in common. The average British manufacturer lists as his main line, and pushes with all his ability, a very well fitted and weighty machine. It possesses at least three speeds, chain cases, shock absorbers, a number of heavy touring fitments, and after the war will probably be further adorned with a bulky and costly dynamo set scaling perhaps 20 lb. complete. This machine is weighty as a solo touring mount, though it is built and used as such, whether it be nominally of 3½ h.p. or 7-9 h.p. Its specification and its weight are based on the fact that a large percentage of the buying public want a double-purpose mount which can haul a sidecar over most of its mileage, though it must be more or less rideable as a solo machine. If it were not for the incubus of the sidecar, our standard leading lines would have been very much simpler and lighter than they are. It may be alleged that the real solo mount is now to be identified in the lower regions of the market, either in the form of the 350 c.c. class or of the baby two-stroke. But this I emphatically deny.

They are not sufficiently rigid and substantial to render high speeds ideally pleasant over ordinary roads. They carbonise too quickly. They do not maintain their power for sufficiently long periods. (The two latter criticisms are true in the present stage of engineering knowledge against all engines habitually run within measurable distance of their maximum output.)

The So-called T.T. Model.

But the average manufacturer of machines of 3½ h.p. and over really concentrates his energies on a single model, which is frankly and obviously a compromise, designed with an eye and a half on the sidecar incubus. He may list a so-called "T.T. model," but in too many instances it is merely his standard mount masquerading under false colours. It may have dropped bars. It may be shorn of a little top hamper. It may have a slightly different set of gear ratios or cam contours. But it is in no real sense a high-powered tourist machine, scientifically designed with a single eye to the fast solo rider.

The Fast Solo Machine.

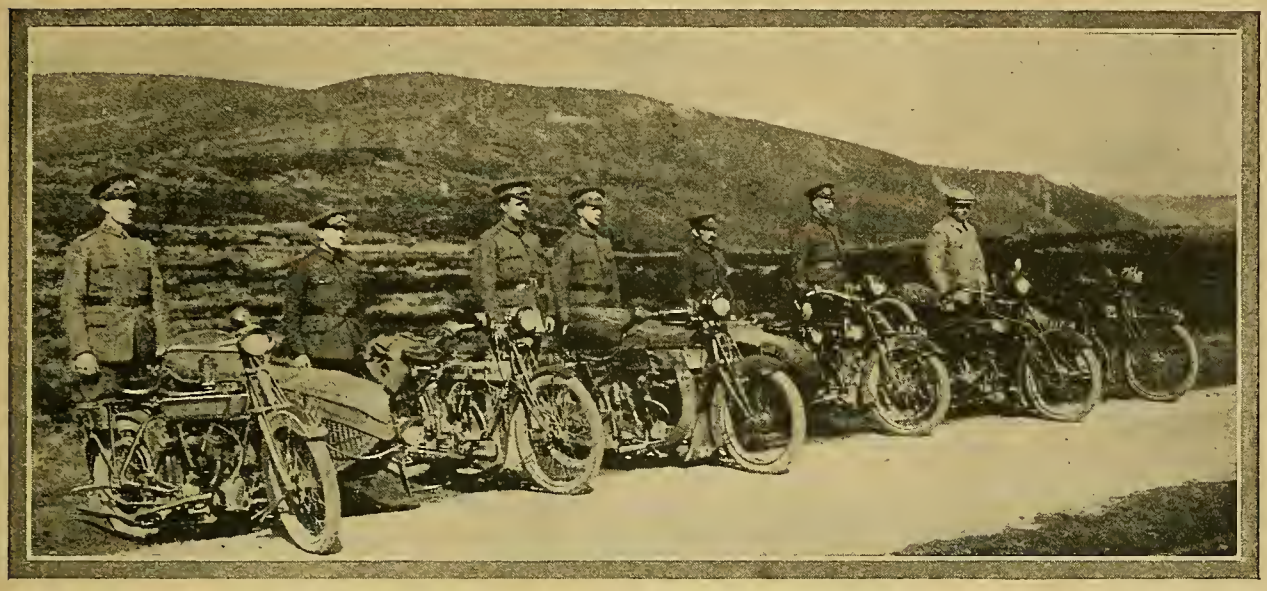
This is where Messrs. Norton and Bradshaw strike out the correct auxiliary policy. Each of them builds a compromise machine; indeed, Mr. Bradshaw goes the whole hog very thoroughly and includes four speeds, hand and foot clutch control, and a completely sprung frame, whilst Mr. Norton is content with a specification more closely resembling that of other makers. But—and here is the point—each of them flanks his compromise take-a-sidecar mount with a special, scientific, and altogether separate 3½ h.p. solo mount, planned and built as if there had never been a sidecar in the world. The "C" model A.B.C. is a special job from stem to stern, and weighs no more than 150 lb. all on. The Brooklands and T.T. Nortons, whilst adopting a simpler type of engine, keep down to a similar weight, religiously serve an even greater simplicity, and attain a similar speed and vivacity. To the best of my belief there are no other firms in the world which have glimpsed the situation quite so thoroughly. The solo market has many sub-departments. There is your genuine slow-speed potterer, who is content with a baby two-stroke. There is your semi-potterer, who prefers a little more speed than the two-strokes afford, but who is too weak and elderly to relish a heavy mount; he may plump for a 350 c.c. four-stroke. There is your unintelligent take-what-is-offered sort of man—he may buy a so-called T.T. model, which is practically a sidecar machine with dropped bars. There is your family man, who would buy two machines, if he could afford them; as he cannot, he makes the best of the very luxurious and cumbrous machines which are solo mounts spoilt by the sidecar incubus. Finally, there is the genuine solo man. He wants an engine of not less than 500 c.c. because it will keep its tune better than any little 'un, and give him a bit more pace on demand. At the same time, he does not see any sense in carting around unnecessary weight with him, and he has learnt to appreciate the extreme handiness and docility of such a mount as the T.T. Douglas. To him the T.T. Norton and the "C" model A.B.C. make an irresistible appeal.

More Speed Wanted.

It is an open question which of these solo markets will best repay the manufacturer for cultivation. I would only point out that the last section of the market must always be large and influential. Motor cycling is, and will long remain, *par excellence*, a young man's sport. Speed is precious to the young; and a flapper bracket will supply most of them with all the passenger-carrying accommodation they command. When the younger and more sporting riders realise that a handful of makers are alone in catering for the scientific solo mount, they will rapidly transfer their custom. Firms which up to the war succeeded in unloading compromise machines on to the solo market will sooner or later be forced to redesign their alleged T.T. models; they may just as well do it now, and get into the post-war market on the ground floor.

Liverpool Volunteer Motor Cyclists.

Results of the Test recently held in North Wales.



The route test and reliability trial of the Motor Cycle Section attached to the Heavy Car Battalion of the Lancashire Motor Volunteers resulted in Squad 4 obtaining the Butterworth Trophy. The contest was over a strenuous course in North Wales and was illustrated in the issue for May 10th. Squad 4, shown above, consisted of Webster, Dumbell, Brag, Brindle, W. Livesey, A. Livesey, Ford.

IN last week's issue we allnded briefly to the recent half-day scheme of the Motor Cyclists' Section of the Liverpool Heavy Car Battalion, Lancashire Motor Volunteers, in which, it will be recalled, a route was chosen over the rough mountain tracks in North Wales. The results of the test were announced by Sub-Commandant J. F. Gobey, when, in the early part of last week, the section indulged in a dinner, held at the Compton Hotel, Liverpool.

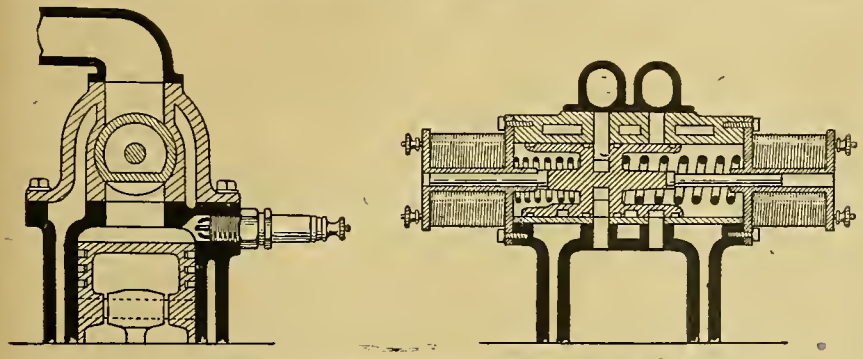
Sub-Commandant Gobey, who acted as judge during the run through North Wales, after making various criticisms and suggestions, stated that on the whole the men performed their difficult task very creditably. The best time from Birkenhead to Llangollen, *via* Caergwrle, Hope Mountain, and Llandegla, was made by No. 4 Section, who accomplished the journey in four hours. He awarded them twelve marks out of a possible sixteen, and the Butterworth Trophy, formerly held by No. 2 Section, now passed into their holding. The latter section received eleven marks, being handicapped on this occasion by having lightweight machines with them. No. 3 also gained eleven marks, and No. 1 six marks.

The Commandant then handed the trophy to Sgt. Webster, of No. 4 Section, after which Squadron-Commander Phillpott concluded the evening by briefly acknowledging the toast.

Electrically Operated Valves!

THE part which electricity plays in the operation of an internal combustion engine is not necessarily limited to the ignition of the charge, as the description of a valve gear invented by Mr. J. C. Youngblood, of Atwood, Kan., U.S.A., will show.

In this engine a sliding valve is placed across the head of the cylinder in such a position that when pulled in one direction it opens the inlet, in the other the exhaust, while when the valve is central, both ports are closed. Normally springs keep the valve in the central position, and the opening of the ports is controlled by electro-magnets on either side of the valve. From the ends of the valve extend arms of soft iron, which enter the hollow cores of the magnet. Current is supplied and the windings of the solenoids energised by an accumulator, the current being directed as required to either side in turn by a suitable distributer. When the cylinder ports are closed they register with recesses in the valve which serve as pockets for any carbon that may be formed.



Sectional elevation of the electrically operated Youngblood valve gear.

The above description has been sent to us by Mr. R. E. Mitchell, of Glasgow, who writes as follows:

"Being, by profession, an electrical engineer, I know the manifold purposes to which electro-magnets can be put, but this is the first time I have heard of them applied to petrol engines. I have since learned that they have been successfully employed for such purposes on large engines (internal combustion) since about 1910. This invention would result in a quiet engine, as all mechanical operation of the valves would be done away with. I believe the magneto could be used to operate the electro-magnets, and, as the latter need not be large, their addition would not mean any alteration to the general design of our present mounts."

The Elieson-Carter Electric Bath Chair.

A Registration and Licensing Question—Is it a Motor Car?

MR. PROSPER ELIESON, who was convicted by the Hampstead Justices on two informations of using an unregistered "motor car" and for driving a motor car without being licensed, and was fined 10s. on each complaint, appealed to the Divisional Court the other day against the conviction. The weight of the bath chair is about 2½ cwt., its motor gives about ¼ h.p., it has an average speed of 2 m.p.h., and its extreme limit of speed is from 4 to 5 m.p.h. (The vehicle was illustrated on page 283 of *The Motor Cycle* of March 29th, 1917.) The Lord Chief Justice dismissed the appeal, and Mr. Justice Ridley and Mr. Justice Avery agreed. The result is that every owner of a four-wheeled motor chair must pay the local taxation licence and register his vehicle as a motor car. Since the machine weighs less than 3 cwt., it seems reasonable that an electrically-propelled bath chair should be registered as a motor cycle and pay motor cycle fees.

The type of electrically-propelled bath chair which was defined as a motor car within the meaning of the Act at a recent appeal before the Divisional Court. Although legally liable for car taxation, it certainly seems absurd that such a vehicle, whose extreme maximum speed is 5 m.p.h., should be mulcted to such an extent.

The motive power of the electrical bath chair is a 40-volt Elieson battery of special accumulators, which are 30% lighter than the ordinary accumulator and have an increased capacity, which convey power to a ¼ h.p. series wound Westminster motor. The controller, which gives four speeds forward and four speeds reverse, is situated conveniently to the driver's right hand on the side of the body. The neutral position is when the lever is vertical, and when it is pulled further back the band brake is applied. An independent brake can be applied to each wheel. A special reversing switch is situated close to the main controller. On the extreme front of the floor boards are a voltmeter, a switch which sets it working, and a socket into which a wall plug may be inserted for charging purposes. The motor driving shaft is coupled on to the armature-shaft. The final drive is by a reversible worm to the two small front wheels, and no differential is fitted. On the front axle there is a small lever which actuates a dog clutch, allowing the motor to be disconnected in case it is required to push the bath chair by hand.

The vehicle we were shown now bears motor cycle registration numbers. We drove it round Messrs. Carter's showrooms at 125, Great Portland Street, London, W.1, and found it particularly easy to control and absolutely ideal for the invalid and infirm. At its maximum speed the vehicle seems, to the ordinary motorist, hardly to be moving. It will, we understand, climb extraordinary hills, but slowly. The total capacity of one charge is twenty miles.

GATHERING OF NORTH-COUNTRY VOLUNTEER MOTOR CYCLISTS.

ON previous occasions we have referred to the proposed gathering of Volunteer Motor Cyclists of the Northern Counties, to be held at Blackpool on June 3rd.

We have now received a copy of the proposed programme, which, however, is subject to amendment.

(1.) All sections will make their own arrangements for proceeding to Blackpool and for lunch at Blackpool.

(2.) 2 o'clock. Combined parade of men and motor cycles at some point to be arranged, lining up in their various sections.

(3.) 2.30. Combined march or ride past on Blackpool Promenade, salute being taken by County Commandant, Col. Smith, V.D.

(4.) 3.15. Display by a squad of the M.C. Section, Liverpool H.C.B., of the signals and movements in use by this section.

(5.) 4 o'clock. Inspection by County Commandant.

(6.) 4.30. County Commandant will address the parade.

(7.) 4.45. Dismiss, each section making its own arrangements for tea and return home.

THE NOVICE.

By ARBUTUS.

HALF an hour, half an hour, half an hour longer;
Twisting himself like a newly-caught "conger";
Testing the spark, yet, oh—
Blaming the magneto!
While his words get so much wronger and stronger.

Boys to the right of him, boys to the left of him—
Almost on top of him—add to his fury.
[Would he acquitted be if he slew two or three?
Nearly—if you an' me got on the jury.]

"Where is that spanner gone? How does this thing screw on?
What is this 'gadget'? 'Compression'—what's that?
Maybe they've left it out! or it fell off, no doubt;
Can't find it, anyhow. Where is my hat?

"I can't stick here all night; no one can set this right;
Sorry I bought the thing; look at my glove!
Must be the gears are wrong—I thought that, all along;
Give me a hand, you boys; help me to shove."

O, the wild charges made, when, overnight delayed,
At an hotel he stayed, dressed like a toff.
Wasn't he half-dismayed! Then, a chap, in the trade,
Showed him the blunder made—
Petrol tap "off."

LETTERS TO THE EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address

"THE MOTOR CYCLE" SPRING FRAME CAMPAIGN.

Sir,—Congratulations on your spring frame campaign, and congratulations, too, to Messrs. W. E. Brough and Co. for recognising the popular demands. I have been interested to read the description of the Brough machine in your last issue; but, having kept before me some of the most promising designs which have been reproduced in *The Motor Cycle*, I notice a great similarity between the Brough design and the design of Mr. Herbert Woods, which appeared in your issue of December 16th, 1915. Of the two, I prefer Mr. Woods's design on account of its neatness. Why is a combination of spiral and laminated spring, as in the Brough design, necessary? Mr. Woods's design is at once so neat and simple that I am astounded that no firm has adopted such a desirable system of springing.

JIM CROW.

BALL BEARING CONNECTING ROD.

Sir,—Now that there are so many motor cyclists in the Air Services, it would be interesting to know their experiences with ball bearing connecting rods which are common on aero engines, and also the single ring piston.

It seems to be generally agreed that in motor cycle manufacture a ball bearing to the connecting rod big-end is a failure, as the bearing will not stand the hammering action. Consequently we see roller bearings more generally used.

Some years ago the piston with a single ring was favoured by racing men, and I believe it is a fact that extra speed can be obtained, but the maintenance of power is the point against it. The Gnome engine, for instance, has a ball bearing big-end (a large one admittedly) and also a single ring piston. Would any airmen motor cyclists who have had extensive experience with one of these engines, record the results obtained, and their preference or otherwise for these two points of design?

Coventry. J.C.B.

"SOME" BICYCLE.

Sir,—I feel that "J.B.T.'s" statements in your issue of May 17th ought not to pass without comment. I gather "J.B.T." refers to the climbing of Sunrising Hill on a two-stroke when he asks: "Why do motor cyclists make assertions of impossible deeds of this kind?"

I assure "J.B.T." that I know Sunrising Hill like the palm of my hand, and also inform him that in 1913 I more than once climbed this hill on a single-geared 2¼ h.p. Baby Levis two-stroke, and I believe Mr. Francis McNab more than once did the same on a similar machine. I weighed thirteen stone and, to the best of my recollection, Mr. McNab is over a stone heavier than I am.

Is "J.B.T." confusing Sunrising Hill, near Stratford-on-Avon, with Rising Sun Hill, near Cheltenham—a very different proposition? ARTHUR M. C. SCOTT, Capt. R.F.C.

Sir,—I notice that "J.B.T." cannot believe that Sunrising Hill can be climbed by a single-geared lightweight two-stroke. I have recently sold my 1915 Baby Levis on which I myself have climbed it three times, and can bring forward three witnesses who saw me do it.

Coventry. J.F.

[Will future contributors to this discussion kindly mention the gear ratio used?—ED.]

EVIDENTLY A HAY-MOTOR.

Sir,—With reference to the so-called hay-motor, page 310 of *The Motor Cycle*, dated April 5th, I read with interest the letter from J. Fletcher, and note his remarks, but apparently his experience is not quite the same as my friend's. My friend, after reading this letter, still adheres to his previous remarks respecting the loss of power noticed while riding past a field of growing clover in full bloom. Mr. Fletcher refers to mustard, and you appear to refer to hay. My friend has ridden a motor cycle for years, and in the early days, when riding a Bat machine, he noticed this peculiar fact. The most recent machine he rode past this particular place was a 3½ h.p. Premier, three-speed, with side-car attached, and it necessitated coming down to second speed, whereas under similar conditions in winter he went up on top. The district in question is in East Suffolk. Going from Diss to Bury St. Edmunds on the main road, through Rickinghall and Wattisfield, you will pass one of the places referred to. My friend is very emphatic about this strange happening, and I give you these details in order that when you have some spare time you can run down and see what happens; probably your engine will seize, especially if it is a three-stroke.

B.E.F. M.T. DRIVER.

LADIES' RIDING ATTIRE.

Sir,—I forward this photograph, thinking it might interest some of your feminine readers. It is, I think, one of the most sensible motor cycling costumes for ladies that I have yet seen. Lately there seems to be less interest in ladies' motor cycling, but after the war I hope it will be taken up again. CHAS. PENNEY.

A sensibly designed riding costume. The suit and gaiters appear to be made of the same material, and no doubt the *tout ensemble* would be very pleasing.

NOT TOO OLD AT ——.

Sir,—After reading the letter of Edwin Butler in *The Motor Cycle* of May 3rd, I am emboldened to write to you, as I may represent one of a type.

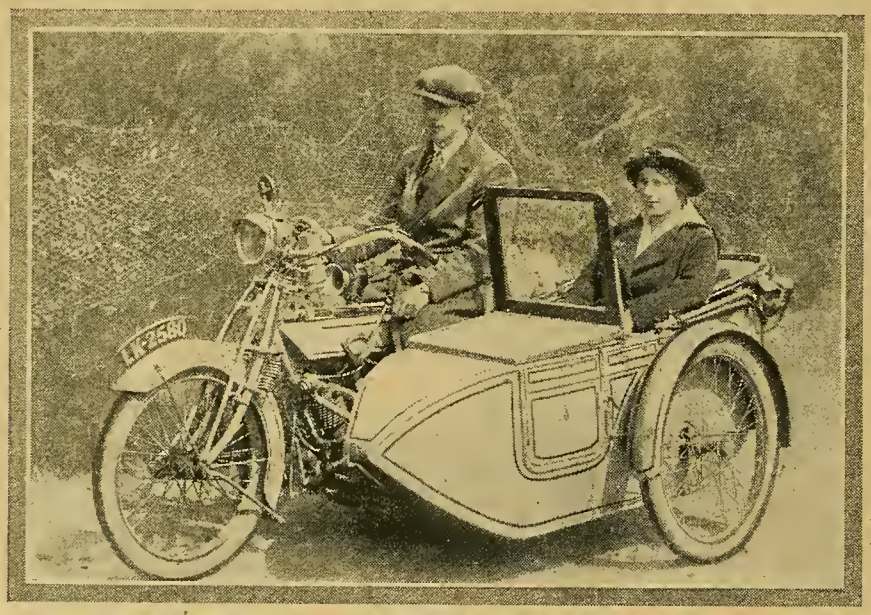
I gave up cycling eighteen years ago, but a recent spin on a free-wheel gave me a desire to return to the pastime if I could free-wheel *uphill*. I am approaching fifty, am a "lightweight" (nine stone), and if I took up motor cycling (solo) it would be for health and recreation—great speed does not appeal to me. The most important factors would be comfort, cost, and economical maintenance.

Newcastle-on-Tyne. *APRES LA GUERRE.*

SINGLE V. TWIN-CYLINDER ENGINES.

Sir,—Just a few words from the user of a V twin; the single versus twin enthusiasts having, in most cases, apparently forgotten its existence.

My mount is a 5 h.p. Hazlewood, heavy combination. In the course of my rounds I am often climbing "young mountains" to reach the various forts, etc., on the Island, but as yet have experienced no difficulty. Anyone who has used the Isle of Wight roads will testify to the fact that there are very few straight stretches and very many hills of the short, sharp variety, with no opportunity to rush them. Brading Hill (1-8) and Carisbrooke Chute are typical examples. You therefore require a machine in good tune, smooth running, and quick to answer the throttle, and I find from experience the V twin fills the bill.



C. Geo. Day, the writer of the accompanying letter, mounted on his 5 h.p. Hazlewood.

It may interest you to know that I was with the Mechanical Transport, A.S.C., from the beginning of the war until February, 1916, when I was discharged for meeting sundry shrapnel at speed (7/9 Indian solo) when in France. The result of this was, sight of left eye gone, left foot mutilated, etc., but in spite of our theoretical ophthalmic friends, I found *no difference* in judging distances, cows, steam-rollers, etc., and I have covered 6,500 miles since then without mishap.

In conclusion, I enclose photograph taken at Freshwater (wife is in sidecar), and, after reading *The Motor Cycle* for seven years, congratulate you on the success you deserve.

I.O.W. C. GEO. DAY.

AIR PRESSURE IN TYRES.

Sir,—Dr. O'Rafferty's letter in *The Motor Cycle* of May 10th, supplemented by Mr. R. L. Boyd's last week, prompts me to venture to trouble you with a few words from a push cyclist of thirty years' experience, who has also done five years' motor cycling. From the day I first rode pneumatic tyres I have always contended that to pump them board-hard is not only detrimental by imposing unnecessary strain on the fabric, but it also defeats the object of the invention, which is, I take it, to eliminate vibration. If you inflate to the utmost capacity you get almost the equivalent of a solid tyre, with all its horrible consequences and disadvantages. A tyre should not be board-hard, but it should be just hard enough to prevent rolling, and, of course, hard enough to prevent the rim from bumping upon the road, and so nipping the tube between the road and the rim, with considerable detriment to the tyre. This happy stage gives a maximum of comfort to the rider and a maximum of life to the tyre.

Another tip which indubitably leads to the longevity of a tyre is this: Should a cycle be standing idle for any period beyond three or four days deflate the tyres (which should be off the ground) until there is only sufficient pressure to keep the tube and outer cover in shape. Tyre fabric needs a "rest" just as much as metal, and in this way it gets it. If this is not done, you have the seeming paradox of tyres being at work while doing nothing, for the expansive pressure is there all the time. The good luck I have enjoyed with tyres (touch wood!) I attribute mainly to the exercise of these simple rules. The idea that a board-hard tyre is more impervious to punctures than one a little softer is a fallacy. How can any material strained practically up to the limit of its strength have a better resisting power? It stands to reason it has less, not more.

One other little point. To exclude wet from cuts in outer covers, has anyone yet found anything better than a patch-quick applied after the application of tyre stopping? It is astonishing how long this, if put on properly, will stick to the tread of even the rear wheel of a sidecar machine.

May I, in conclusion, as a constant reader, thank *The Motor Cycle* for many very useful tips in the past?

A. J. GARSTONE.

Sir,—I cannot say that I agree with Dr. O'Rafferty in his remarks on this subject in the issue of May 10th. I have had experience with most makes of tyres for the past ten years, and my own experience has been that if the tyres are pumped up as hard as possible (not hard enough to burst, of course) they are less liable to get punctured, less liable to crack round the edges—both inside and outside—less liable to skid, less liable to damage the canvas on the inside of the tyre, through the rim being forced down on the tyre while passing over a bad road, so that the tyres will do a greater mileage, and the rims will not be damaged in the least. If the tyres be only half blown up, when going over a bad piece of road a collision between the rim and the road is almost unavoidable, and also damage to the rim.

Another point is that the harder the tyres are blown up, the less chance there is of water getting in between the beaded edge and the rims, which will cause the tyres to rust on to the wheels, and every practical motor cyclist knows the injury inflicted on the tyre when removing it from the rim for repairing a puncture, when it is rusted on to the rim. Personally, I have not noticed much difference in comfort between a very hard tyre and a softer one, but as I am somewhat corpulent, and *have* to have tyres hard, perhaps I am not in a position to express an opinion.

One word more: most tyre manufacturers make a great point of impressing upon their customers the importance of blowing their tyres up hard, and more than once I have known a firm inform a customer, who has complained, that the cause of the trouble was through not blowing the tyres up hard enough.

H. E. CARTWRIGHT.

EFFICIENCY AND LIGHTNESS.

Sir,—In my opinion, efficiency and lightness are not the main points to be aimed at in a motor cycle engine for general purposes. Almost more important ones are substantiality, first-class materials and workmanship, and not too high an efficiency, but rather a biggish engine running comfortably at a comparatively low-power output for its size. Of course the A.B.C. design with overhead exhaust valve is quite excellent, and the designer has adopted the principles of the Renault air-cooled aero engine, of several years' standing. However, it is quite possible, and not a difficult matter, to overcome the loss of circularity of the cylinder walls when hot in the case of the more conventional arrangements of valves, and the M.A.G. Engine Co. undoubtedly have their own method of attaining this end, as have the Norton Co.

For racing purposes the A.B.C. engine design is excellent, but for general purposes—taking every factor into consideration—a V engine, such as the M.A.G. 7 h.p. engine, almost gets top marks, I think.

I am, of course, merely an amateur in motor cycle matters, and have no interest whatever in the M.A.G., the A.B.C., or the Norton. N. LEGGE.

A FRENCHMAN'S IDEAL.

Sir,—I submit what I think would be the specification of the ideal *double-purpose* motor cycle.

ENGINE.—Flat twin, 625 c.c., w.c. preferred; easily detachable cylinders.

FRAME.—Sprung front and rear (the rear part triangular, as Matchless).

GEARS.—Four-speed gear box, 4-6-8-12 to 1, double-controlled clutch, hand or foot; gear lever on right-hand side.

BRAKES.—Internal expanding on rear wheel, foot-controlled; hand brake on rear wheel (no brake on front wheel).

LUBRICATION.—Throttle controlled direct to front cylinder gudgeon pin, big-end, and crankshaft.

WHEELS.—Detachable and interchangeable, 3in. tyres.

TRANSMISSION —All chain, with two shock absorbers (Enfield).

STANDS.—Rear spring stand (Rudge), front under the engine (Motosacoche).

MAGNETO.—Gear driven, with shields (Matchless).

HUBS.—Mud and wet proof.

FOOTRESTS.—Semi-T.T. handle-bars, all-black or khaki finish, 6in. clearance; mudguards with no side valance, as Triumph (front guard).

Being an old reader of *The Motor Cycle* (since 1911) I receive it with much pleasure. A. GASPARD,

France. Moto Cycliste, S.P. 178.

PETROL PERMITS.

Sir,—Having been a weekly reader of your valuable paper for over five years, I should esteem it a favour if you can find space for the following.

The firm I represent are contractors to His Majesty's Government, who are users of no fewer than 12,000 of the machines which I represent. In January last I forwarded 6s. for tax on a grant of twelve gallons of petrol for three months. I got no acknowledgment, nor the actual licence. Now it has come to our notice that all riders of motor cycles and combination turnouts are disallowed petrol.

My business, according to the contract made between my firm and the Government, is to keep in repair a large proportion of these machines, besides the commercial side of the business, and I have constantly to go to H.M. factories, which necessitates wasting time by having to travel by the tram and 'bus.

Now I have been recommended petrol by the Ministry of Munitions of War, Henbury. The Petrol Control Committee sent the recommendation to the Priority section. The reply was an absolute refusal owing to national shortage. Yet the young bloods and many other selfish humbugs go about to-day riding in motor cars, and motor cycles with girls riding on the carriers, and the man who has legitimate business to attend to is deprived of even a spot of spirit.

I have served my country, and am endeavouring to serve it still by carrying out the contract made between the Government and my firm.

I am also a badged Voluntary Service Corps member of the A.A.

Is this fair? R. F. MOORE (Lieut.).

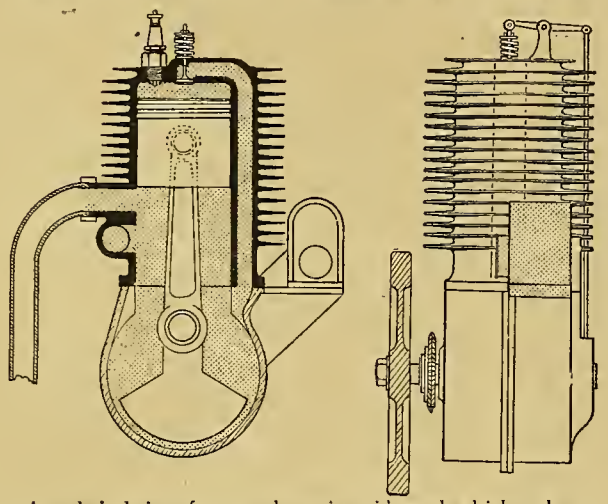
TWO-STROKE DESIGN.

Sir,—Perhaps the enclosed sketches and explanations might be of some interest to those of your readers who are interested in two-strokes and their improvement.

I do not know if the idea is an old one or not, but I have not come across it yet. The nearest approach was a novel design which appeared in your issue of April 12th, under the heading of "Patents." But that design had the exhaust in the cylinder head, and the inlet at the bottom of the cylinder. I should imagine that the disadvantages of having the exhaust on top would be that—

1. The exhaust port could not be made large enough.
2. It would not tend to make the plug any cooler.

In the enclosed sketches which I have adapted to suit the motor cycle engine (I am at present working on a water-cooled model) the inlet is on top and the exhaust in the usual position. The inlet valve is worked by a cam and rod and timed to open just after the exhaust port is uncovered, shutting again when the piston commences its upward stroke.



A reader's design of two-stroke engine with overhead inlet valve.

The mixture would be drawn into the crank case in the usual way. The probable advantages I have enumerated below.

1. Although in the sketch there is only the conventional exhaust port shown, there is no reason, as far as I can see, against having the exhaust ports extended round the greater part of the circumference of the cylinder, and the exhaust gases led away by more than one exhaust pipe. This is an obvious advantage, in that it would provide a larger and thus freer exit for the exhaust, with improved scavenging.
2. The inlet being central and in the cylinder head the incoming mixture can enter the cylinder direct instead of hitting a baffle and travelling up the cylinder and round to the other side. This would also help the exit of the exhaust.
3. The sparking plug, being next to the inlet, would be cooled down by the fresh mixture, thus minimising a great trouble that I believe is at present experienced in two-strokes.
4. The casting for the piston would be simpler and lighter.

Its disadvantages would be:

1. The addition of a valve would render the engine liable to all the accidents which happen to valves.
2. The life of the valve and spring would be shorter than usual, as it acts every stroke instead of every other stroke.
3. A slight additional complication in the cylinder casting.

I think that if all the principal advantages and disadvantages have been stated above the advantages considerably outweigh the disadvantages.

C. J. M. HAMILTON (Sub-Lt.).

THE NEED FOR PAPER ECONOMY.

The only way to ensure regular receipt of this journal is to place a definite order with your newsagent or the publishers.

This action will enable newsagents to limit their orders to the actual number of copies required, and so effect a saving of paper, labour, and railway transport.

THE war has entirely wiped out a prejudice that at one time existed against the lady motor cyclist. We no longer encounter horrified glances from pedestrians. One and all are now anxious to be taught to manage the motor cycle that has been left in the garage by one who is probably having his first taste of Army discipline.

I was watching a few days ago the riders who surged past me on the London-Brighton road. It was near the foot of Box Hill, and I was hoping some venturesome spirit would try his motor cycle up the famous gradient, where the road has been made well nigh impassable by the Government timber waggons that are removing so many of the beautiful trees to more useful spheres. The results, I imagined, would be so interesting.

A Smart Turnout.

Several ladies drove past, all appearing businesslike and at home with their machines. Open frames seemed few and far between; either the public fancy is strongly in favour of the diamond-framed mount, or maybe the fair sex is taking over the steering of the family mount. One particularly striking outfit was a red Indian and sidecar, the girl at the helm dressed becomingly in a coat and tam-o'-shanter of the same hue. She drove her machine slowly, giving the onlookers ample time to appreciate the full effect of the tasteful turnout. The attentive attitude of the khaki-clad passenger suggested more than a brotherly interest, by the way.

Pleasure spins are likely to be fewer than ever. Already folk who at one time practically lived on their mounts find that a few hours during the week-end are all they can now spend on the road. The girls in the photograph reproduced, working in the Admiralty Offices during the week, spend their relaxation hours in this healthy and enjoyable way. I found them waiting at forked roads, puzzled as to their route, and waiting for a companion to come along and decide. In spite of oft-repeated warnings against pillion riding, these two young members of our sex enjoy indulging in the apparently dangerous sport. Although a safe seat in the sidecar is available, one finds young people who refuse it for the real pleasure of nonchalantly sitting on a carrier — less prosaic, they say.

(Top) A neat way of carrying tools. They are enclosed in a compartment snugly fitted into the door of the sidecar of a Chater-Lea combination owned by Mr. J. Dunkin, of Pimlico.

(Bottom) In spite of the oft-repeated warning against pillion riding, the Misses Dunkin thoroughly enjoy it during the relaxation of their work at the Admiralty Offices Their mount is a Douglas.

"Paddle" Start.

Their manner of starting interested me, for both rider and passenger used their feet to paddle off. Personally, I am an advocate of the handle-bar clutch for ladies' use: it is so easily manipulated without engaging either of the feet, which are generally needed for balance. The slight reluctance to start was attributed by the riders to the fuel, which they described as "half and half." A few drops were issuing from the carburetter, and they

Through Feminine Goggles. –

cheerfully dismantled the float chamber to remedy a sticking needle whilst waiting for a lingering parent, who arrived in charge of a Chater-Lea combination, the sidecar of which was exceptional in its fitments. The tool kit was enclosed in a compartment built into the interior of the sidecar door, and revealed by removing a slide. The door, too, had a safety catch, in addition to the usual fastening, to prevent it from opening accidentally. These two cute ideas were the driver's own inventions, being designed in the former case to allow the passenger to remain seated in the event of a wayside adjustment, and the latter to prevent losing the wraps and overalls that are often flung carelessly into the toe of the sidecar. The inventor was a most interesting veteran of the road, having been a racing push cyclist in the days of the old bone-shakers. His enthusiasm was still warm on the subject of "the open road."

It is wonderful how the road retains one's affections. Tired, maybe, at the end of a day's riding, we arise the next ready and even eager to be off again. Shall we ever, I wonder, grow too old for its pleasures, or shall we, when years have come upon us, and we have grown too decrepit to steer a mount ourselves, claim a place in the sidecar seat?

GUDGEON PIN FIXING.

SOME FAULTS AT PRESENT COMMON—AND A SUGGESTION.

MESSRS. CROW BROTHERS, the light car and motor cycle specialists of Guildford, whose experience with a large number of different engines makes them very competent to judge, wish to direct the attention of manufacturers to the unsatisfactory methods which are at present in use of securing the gudgeon pins to the pistons. At the same time they suggest an alternative which has already been put forward in our pages, viz., that of fixing the gudgeon pin to the connecting rod and providing bearings in the piston instead of the reverse. They write as follows:

"It may seem unnecessary to criticise just now; but our experience is that there is not at present on the market a really ideal method of fixing the gudgeon pin in the piston, and that on only one make of engine will the gudgeon pin keep tight indefinitely, and with that make it is very difficult for the amateur to take out his gudgeon pin without risk of cracking or distorting the piston. Other makers have delightfully simple methods of fixing, and their pistons can be removed in a few seconds without risk of damage, but they all sooner or later develop play between the gudgeon pin and the piston. A few still pin their faith to the set screw, which, in time, loses its thread and falls out, generally smashing the piston, and sometimes the cylinder, too, or else it drops quietly to the bottom of the crank case, while the ends of the gudgeon pin 'get busy' on the cylinder walls. The method of securing the set screw with a wire is quite effective, but most awkward to fit and remove without special skill.

"Many of the methods used are clever and simple, but the gudgeon pins never remain tight in the pistons for long. It is a positive fact that one make of machine with a very high reputation can be depended upon invariably to have loose gudgeon pins after the first 2,000 miles running. This we have repeatedly proved. When once this trouble has started it is tiresome to remedy, as it means reamering the holes in the piston and making a special gudgeon pin to fit.

"Now, bearing in mind the bad wearing qualities of 'small end' bearings, why do we not kill two birds with one stone and get over both difficulties by adopting the method used on some American cars, that of fixing the gudgeon pin *in the connecting rod* and letting the piston swing on the gudgeon pin? How can the unfortunate small end bearing be expected to last when all the oil it ever gets has to be splashed up inside the piston and then find its way into the bearing? With the piston working on a fixed gudgeon pin the latter would get copious lubrication from the cylinder walls.

"Another point in favour of this method is the larger bearing length made possible, and the fact of the load being supported at two separated points instead of only one in the centre would lessen the likelihood of 'rock' developing, which occurs all too soon in the ordinary way. Lastly, this method should be by far the cheapest from the manufacturing standpoint. The boss at the top of the connecting rod is not bushed, but has a reamered hole which the gudgeon pin fits. The boss is extended on one side and split there, and a bolt pinches it up tightly, holding the gudgeon pin.

"We should not think bushes in the piston would be required, but if they were that would not be a difficulty. Any amateur would be able, with a box spanner (provided in the tool kit for the job), to loosen the bolt half a turn and push out the gudgeon pin in a few moments.

"We should be very interested to know if any of our manufacturers have tried this idea, and what objections can be raised to it."

Scottish ladies aboard a 5-6 h.p. Rudge-Multi sidecar. The owner, Mr. G. Warden, of Dundee, reports that, in spite of the outfit having been in use for 8,000 miles, the enamel and plating are not scratched.

AERO ENGINE DESIGN.

Some Observations upon the Design and Construction of Aircraft Engines, and Comparisons with Motor Car Engines.

FOLLOWING is a *précis* of a lecture delivered by Mr. Louis Coatalen at the ninth meeting of the 1917 session of the Aeronautical Society of Great Britain at the Society of Arts, John Street, Adelphi, London, Dr. Dugald Clerk, F.R.S., in the chair. The subject was "Aircraft and Motor Car Engine Design: From the standpoint of a Designer and Manufacturer of both types."

Fundamentally Opposite Aims.

Mr. Coatalen opened by saying that the British national habit of decrying our own achievements and praising that of foreigners, notably the Germans, was never more in evidence than in the case of the aircraft engine problem; nor was it ever less justified. The case of the latest six-cylinder Mercédès engine to be captured by the Allies might be taken by way of illustration. Without water and radiator it weighed 3½ lb. per horse-power; whereas the latest British water-cooled aircraft engine in the same condition weighed 1 lb. less per horse-power. As regards efficiency, he claimed that this country had produced engines that were out and away superior to anything which our enemies had employed in the campaign to date.

The aircraft engine proposition calls, notably, for the exploitation of new methods of achieving lubrication, in that the system that suffices for a car proves inefficient for aircraft engines of high output, which are alone useful in warfare to-day. The lubricant becomes too hot, therefore too fluid, resulting in the reduction of pressure to the main bearings, hence the evolution of the dry sump system for lubricating aircraft engines.

Value of Racing Experience.

"We must not lose sight of the likelihood that the rapid evolution of the aircraft engine during this war and the extraordinarily wide manufacturing experience which is the outcome of that, will at some future time exercise more than a temporary effect on the design and manufacture of engines for car service," he said. He held that there was a closer analogy between the motor car engine designed and built specially for racing before the war and the wartime aircraft engine, than there was between either that type of car engine and the standardised car motor, or, again, the standardised car motor and the aircraft engine of to-day. For instance, the racing car engine resembles the latest aviation types in that a very high mean effective pressure has to be obtained with it. As the problem in both cases is power for weight and engine volume, and not silence and low cost, great freedom is allowed the designer of a racing car engine as regards piston clearances, valve timing, compression, largeness of valve area, strength of valve springs, and so forth, the particulars in this connection approximating much more to aviation than to standard car practice.

There are strict limits to the sizes which are practicable for radial engines, whether of the rotary or stationary types. In regard to either vertical or V-type engines, the nature of the particular service to which each individual machine is to be put likewise imposes certain limits on design. Sometimes this may concern the overall length of the engine, particularly when in waging war in the air it is essential to lose the minimum time in altering the attitude of the machine from a diving position to a very steep climbing one. Again, some series of aircraft call for the minimum head resistance, but are less imperative as to overall length. Hence six-cylinder types would be suitable for such service, whereas V-shaped varieties might not be.

Connecting Rod Forms.

Of course, both the radial and the V type aircraft engines have introduced problems of design, the solution of which does not appear to be yet complete. In these varieties of engine design you have more than one piston attached to each crank pin. The diversity of opinion concerns the means by which this is done. Naturally the design of eight and of twelve-cylinder standard engines for car service, such as our American friends are producing in large quantities, does not call for the same amount of care in this regard as is essential in the case of the more heavily loaded aircraft engine. The original form was that in which the end of the subsidiary connecting rod is mounted on the outside of the main connecting rod. This, however, makes relatively a large big-end not suitable for engines from which is demanded the high duty necessary for aircraft service, as the wear of the big-end is controlled by its weight and oil pressure.

A lighter construction is achieved by the link-rod method, wherein the subsidiary member is attached to the main one by a pin placed as near the centre of the crank pin as possible. This arrangement has the additional advantage of rendering it considerably simpler to take up any wear in the big-end bearings. For obvious reasons, in the former type that operation is not a very easy one. The latter type, however, introduces a further problem. Owing to the centres of the main pins, the movement of them is along an elliptical path in contradistinction to that of the crank pin, which, of course, is circular. The ellipse has the effect of altering the stroke of the piston attached to the subsidiary rod. The extent of the variation depends on the angular position of this pin with the centre line of the main connecting rod, the distance from the main pin to the rod pin remaining constant.

Hard and Fast Rules Impossible.

At this period it is impossible to lay down any arbitrary rules as to any one type of aircraft engine being suitable for the needs of all aircraft service. Those needs are almost as various as are the demands for special varieties of steel and alloys. Moreover, they are likely to multiply with the lapse of time. Aircraft engine design resembles motor car engine production in this particular, that it is all the time a question of compromise.

For short flights the rotary type of engine generally, and the air-cooled varieties, have shown up to advantage to date, though with them the consumption of fuel and lubricating oil may be comparatively high; this is offset by the relative lightness of their starting weight. But for longer flights, in connection with which petrol and oil consumption have to be reckoned with as part of the engine weight, water-cooled stationary type engines have proved most suitable.

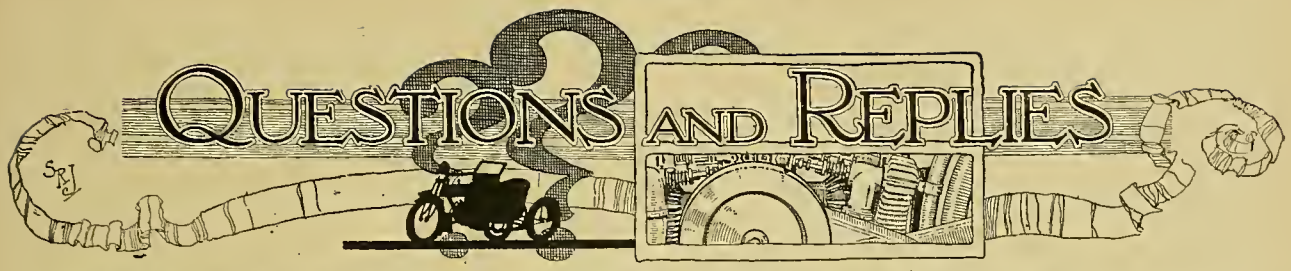
2.6 lb. per Horse-power.

Speaking broadly, as regards weight per horse-power, progress in the design of the ordinary water-cooled type of aircraft engine has been very marked. In the brief period of two years Sunbeam-Coatalen aircraft engines of this type have been reduced in weight from 4.3 lb. per horse-power to 2.6 lb. per horse-power.

Not only has there been much improvement in cast iron available for cylinders; aluminium alloys employed with knowledge and skill for that purpose have been found, besides, of great advantage, of course, reducing weight per horse-power to an extraordinary extent. Though we are merely on the threshold of realising the possibilities of aluminium alloys for cylinder castings, it cannot be doubted that within a very brief period they will be recognised as the standard materials for this work, cast iron thenceforward being discarded in favour of them. For two years Mr. Coatalen has standardised aluminium alloy pistons with excellent results.

Cooling and Carburation.

It is notable, further, that air-cooling is coming into favour increasingly. The introduction of aluminium alloy in the manufacture of the cylinders has exercised a marked effect in regard to this tendency. In the near future air-cooled engines of greater power may be expected to materialise. Whereas at the beginning of the war the maximum mean effective pressure was 106.135 lb., to-day it has been increased to 134 lb. per square inch measured from the brake horse-power and, in some cases, actually through the reduction gear. In regard to methods of engine rating, Mr. Coatalen wishes to propose that the horse-power per unit capacity obtained from any given engine should be taken as the standard for preparing the different "duties" of aircraft engines. The capacity taken would be the capacity per cylinder multiplied by the number of cylinders, and by the number of complete cycles per minute. With this aim in view, the horse-power per litre engine capacity per thousand cycles (2,000 r.p.m.) is proposed.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects

A Stiff Clutch.

I should be glad if you would give me advice regarding the clutch of my 1914-5 Rudge-Multi 3½ h.p. The pedals are extremely stiff to turn unless the machine is put on the stand, which is inconvenient with the sidecar attached. If I adjust, to make pedals work easier (as per book of iustructions), there is clutch slip. I have fitted a new set of plates and springs, but no improvement has resulted.—R.S.

It is very difficult to adjust a multiple-disc clutch so as to obtain perfect freedom. A certain amount of drag invariably exists. We can only recommend you to experiment with various adjustments; but we are doubtful whether you will obtain perfect freedom. Are you using a very heavy grade engine oil, as this would cause the plates to gum up? The clutch should be kept clean internally.

Irregular Firing.

I have a 5-6 h.p. V twin motor cycle, date about 1912. It has dry battery ignition, and I have had great trouble with the front cylinder. The back cylinder I can generally start up, but the front one very seldom fires—sometimes not at all, even when the back one is running all right, and then only when the ignition is fully advanced. I have tried altering it from answers in your paper, but with no result. The plug shows a spark as good as in the back cylinder. These troubles occurred when the petrol was fairly good. The engine has a.o. valves, $\frac{3}{32}$ lift, and about 5 ozs. are required to open them. Both valves have the same opening. If I inject petrol after pedalling there is no improvement. I find both plug and inlet pipe well covered with petrol. Do you think a magneto would make all the difference to the front cylinder?—W.H.

If the spark is as good in the front cylinder as in the back cylinder it seems almost as if your trouble is due not so much to the ignition as to some other defect, such as a leaky inlet pipe, causing an air leak, or to a weak inlet valve spring, preventing the valve from closing properly, or possibly to worn carburette slides. You do not mention the type of carburetter fitted to your machine, but if by any chance a surface carburetter is fitted then the quality of the petrol will make a great difference, whereas if an ordinary spray carburetter is fitted the engine will consume almost anything, especially if the air is taken in warm. Undoubtedly a magneto would give far cleaner firing. Though the spark may be good yet the engine may fail to develop its full power and run unevenly, owing to the fact that the firing is not synchronised, as often happens with battery ignition.

Gear Adjustment.

I have a 1915 P. and M., and there being considerable movement on the two-speed gear lever, I recently inserted two of the thin metal strips into the split wedge bars to thicken them. These packing pieces are provided by the makers for taking up slack, and this they have done very effectively. The gear has never worked properly since, however. It gets very hot and seems to bind. I shall be obliged if you will let me have the cause of this and the remedy.—L.A.S.

The liners you have inserted are too thick, or there was insufficient wear in the gear to permit their use. The result is that both expanding rings are binding—*i.e.*, the low gear is gripping with the high gear engaged, and *vice versâ*. We would advise you to remove the liners immediately, or considerable wear of the gear will occur, the heat generated causing the oil to run out.

Overheating.

I have a 1917 3 h.p. V twin with mechanically circulated lubrication. The engine overheats and loses power after a short run, though it runs perfectly when cold. I cannot get the engine to smoke, but I find plenty of oil in the exhaust pipe and silencer. The oil circulates in the tank quite fast. Could you tell me how to make the pump feed more oil to the crank case and draw less out of it? I have had to fit new piston rings on the front cylinder, as the old ones seized up.—C.L.

The oil pump cannot draw oil out of the sump unless the oil is above the correct level. If there is too much oil in the sump the return pump will bring it down to its correct level, having done which it returns only the overflow. The needle valve governs the supply from the tank, and it should feed quite sufficient to keep the oil in the sump at the correct level. Apparently only the front cylinder is starved, and we would suggest that you fit a gravity feed to the walls of the front cylinder, with ordinary tap control.

Wiring a Lighting Set.

I have an F.R.S. magneto lighting set to fit on my 6 h.p. A.J.S. outfit. My magneto is a Dixie, and has *no* cut-out terminal. I wrote to the Splitdorf Co. for their advice, but they replied that their magneto was intended for the purpose of ignition only. Please tell me where to make the connection to the magneto.—W.A.D.

As the makers of the magneto state that the instrument is for ignition purposes only, we think you would be ill-advised to act counter to their decision. The F.R.S. lighting set was primarily designed for a Bosch type of magneto, in which the contact could be taken from an insulated terminal connected with the central screw which holds the contact breaker in place.

Road Speeds

(1.) Could you please tell me the approximate speed a new 1916 5 h.p. Bat-Jap should attain without any tuning? (2.) The approximate speed of a 1916 3½ h.p. Brough untuned? (3.) I want to have my cylinders ground rather a loose fit to prevent seizing while racing. What fit do you recommend, the engine being a 5 h.p. J.A.P.? (4.) Can an engine seize if there is oil in the cylinder? (5.) When balancing the road wheels of a motor cycle, is it best to drop some solder on the rim opposite the valve and then file it off until correct?—N.V.

(1.) It depends entirely upon the gear. With a sidecar gear of 5 to 1 probably 48 m.p.h. With overhead valves 55 m.p.h. With a solo gear of, say, 3½ to 1 it should touch 60 m.p.h. This engine is designed for hard pulling before speed. (2.) A standard model overhead valve Brough would probably attain 62 m.p.h.; a specially tuned model about 70 m.p.h. (3.) The usual clearance allowed is 1-1,000in. for every inch of bore. Aero engine pistons are made rather slacker, but the above is a safe rule for touring. If you worked to this gauge, then ground pistons in rather freely, you would obtain a safe fit for high speeds. (4.) So long as there is a film of oil over the friction faces, seizure is impossible. It may occur by a piston being so tight a fit that lubrication does not work up the skirt to the rings, but drilling the skirt should prevent this. Overheating, again, may burn away the film of oil and cause a sudden seizure. (5.) Yes, this would be quite a good way of doing it.

Gear Ratios.

(1.) Will 4½ to 1 fixed gear be too high for climbing stiff hills on 2¾ h.p. motor cycle? (2.) As the engine has been recently overhauled, rebushed, new piston fitted, and the cylinder rebored, what mileage per hour should I get from a 2¾ h.p., and how much per gallon should the consumption be? (3.) By fitting a hot-air intake, would I obtain more power and more miles per gallon?—G.W.M.

(1.) Yes, the gear will be too high for climbing steep hills. Five to one would be nearer the mark. (2.) On the level you should get a speed of about thirty-five miles an hour, and you ought to get between ninety and a hundred miles to the gallon at, say, twenty-five miles an hour. (3.) By fitting a hot-air intake you would get greater flexibility and economy, but not necessarily more power.

Pre-ignition.

(1.) My mount is a 2¾ h.p. J.A.P.-engined motor cycle, and, until recently, I have been troubled with a mysterious pulling up which, I am sure, is due to the ignition. The trouble occurs when I have been about ten miles, and completely pulls me up, but if I change down into a lower gear the engine will fire, but when I change up and have gone another six miles the trouble again repeats itself. I have cleaned the magneto, tried three different kinds of plugs, and have also cleaned out the carburetter, but this does not improve matters. Retarding the magneto, also closing the air, does not alter things. Excepting for this trouble, the engine runs perfectly. (2.) When screwing the inlet valve cap into my engine I was unfortunate enough to chip a small piece of metal out at the top of the cylinder where the valve cap enters the engine. How I have got over this trouble is by filling the little gap with asbestos and seccotine, and screwing the valve cap down tightly. This is satisfactory enough, but after a few miles the seccotine melts, and this causes a little blow, with the result that the petrol consumption is affected. The correct way in dealing with this would be to have a piece of metal welded, but nobody will take this job on because it is so small. However, I can get over the trouble as mentioned above if only I can find a substance (to take the place of seccotine) which will stand the heat. Do you know of a substance? Would boiled linseed oil be of any use, or can you advise a better method of dealing with this?—F.A.U.

(1.) The trouble may be due to pre-ignition caused by the use of an unsuitable plug. If you change your plug to one of first-class manufacture with fairly substantial electrodes the trouble should cease. Probably all three plugs you have tried suffered from the same fault in design. (2.) It is just possible that iron cement might serve your purpose, but we have not tried it. It can be obtained from one of the large tool makers or accessory dealers. Failing this, welding seems to be the only solution of the difficulty.

Fowls on the Road.

One morning last week I was thrown from my motor cycle and considerably bruised, just missing a serious accident. I was travelling along a well-known high road, on which there is a considerable amount of traffic at every hour of the day, and had throttled down to about 10 m.p.h. to pass a motor lorry. Some fowls were feeding in the hedge about twenty yards to my right, when a hen suddenly "got the wind up" and flew across the front of the lorry into my front wheel. I missed the lorry, but it might have been otherwise. I am told that I am liable for the value of the fowl. It does not seem just to me that I should suffer because a farmer chooses to allow his hens to wander about the highway seeking food.—INJURED.

You are most certainly not liable for the value of the fowl. Fowls have no business in the roads, except when being driven from place to place. Really the owner of the fowl, being in the wrong, should be held responsible for the damage, but it is quite useless for you to sue for this, owing to the absurd state of the law on the matter. Your best course is to complain to the local police superintendent that the fowls are allowed to stray on the road.

DELAYS IN POSTAL DELIVERIES.

In view of depleted staffs, the curtailment of railway services, and the consequent delay in delivery of mails, readers will greatly assist by forwarding communications (including advertisements) as much as possible in advance of the dates of the issues for which they are intended.

Small Power after Overhaul.

I have just been overhauling a Scott twin two-stroke, and put it up again, but since then it does not run as it did. Timed piston dead centre, spark about half retarded, and platinum tips just about to break apart. Can you please tell me: (1.) Why it occasionally fires in crank case? (2.) Is it timed too late? (3.) Why it refused to take air off the air lever? (4.) The position of the holes in the two sliding or twisting cups in the bottom of a Scott carburetter? The bottom of the outside cup having come loose, I may have fastened it in wrongly. I have put the holes to be open when the throttle lever is about half open.—A.W.D.

Your engine will not pull well after being cleaned out until it has done 100 miles or more—particularly if you have removed the carbon from behind the piston rings. The rings of a Scott seldom stick in the grooves, and therefore they need not be touched during decarbonisation. (1.) Probably the rubber joint between cylinder casting and crank case has not been replaced properly. Perfect accuracy in the bedding of this joint is necessary. We should advise you to make quite sure of this point, as the joint is difficult to make. Too weak a mixture, the transfer gauzes being burnt out, or excessively retarded ignition would also cause the symptoms you describe. (2.) The ignition timing is too far retarded. Piston dead on centre, platinum points just breaking, ignition lever fully retarded, should be about right. (3.) This may be due to one or a combination of the inaccuracies above suggested. We think that if you correct the timing and make sure the cylinder joint is good, your engine will take more air. Whether or not the air lever can be freely used is a matter of carburetter setting. Make sure also that there is no air leak at the joint where the induction pipe meets the crank case. Possibly you have an air leakage. (4.) Get the other adjustments correct, then decide this by practical road test. Presumably your engine is getting too weak a mixture.

A Cracked Piston.

I have a cracked piston. It is cracked from the bottom for about ¼in. upwards, terminating at a hole that is left in the piston for oiling purposes. Do you think this will extend any further?—N.S.

As the crack terminates at the hole in the piston it is improbable that it will extend further. Still, its presence must weaken the piston very considerably, and it might be better to have it acetylene welded than to take the risk of a broken piston.

RECOMMENDED ROUTES.

LONDON TO SIDMOUTH.—L.E.B.

London, Kingston, Esher, Cobham, Ripley, Guildford, along the Hog's Back, Farnham, Alton, Alresford, Winchester, Romsey, Cadnam, Ringwood, Wimborne, Bere Regis, Dorchester, Bridport, Lyme Regis, Colyford, Sidmouth. Approximately 170 miles.

MANCHESTER TO WEYMOUTH.—F.W.

Manchester, Altrincham, Northwich, Tarporley, Whitchurch, Wellington, Bridgnorth, Kidderminster, Worcester, Tewkesbury, Gloucester, Stroud, Nailsworth, Dunkirk, Crosshands, Swainswick, Bath, Beckington, Warminster, Shaftesbury, Blandford, Dorchester, Weymouth.

LLANDRINDOD WELLS TO LONDON.—L.E.B.

Llandrindod Wells, New Radnor, Kington, Leominster, Bromyard, Worcester, Evesham, Broadway, Moreton-in-the-Marsh, Chipping Norton, Enstone, Bletchington, Islip, Wheatley, Stokenchurch, Wycombe, Beaconsfield, Uxbridge, Ealing, London. The last part of the journey, say from Beaconsfield, is very rough. Approximately 165 miles.

PORTSMOUTH TO MANCHESTER.—J.W.McC.

Portsmouth, Fareham, Bishop's Waltham, Winchester, Whitchurch, Newbury, Hungerford, Aldbourne, Stratton, Cricklade, Cirencester, Cheltenham, Tewkesbury, Worcester, Kidderminster, Bridgnorth, Wellington, Hodnet, Whitchurch, Tarporley, Crabtree Green, Northwich, Mere Corner, Altrincham, Manchester. Approximately 235 miles. This route avoids the Potteries and Black Country.

Economical Insurance for Motor Cyclists

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£10 will be paid for information which may lead to the recovery of a "Royal Enfield" 6 h.p. Combination. Registration No. MX 6681, Engine No. W 5071. Special screen and hood, Watford speedometer No. 705, 1915 make. Also the same amount will be paid for similar information leading to the recovery of a 1914/15 3½ h.p. Twin "Zenith," Engine No. 52830, mag. chain case slightly damaged.

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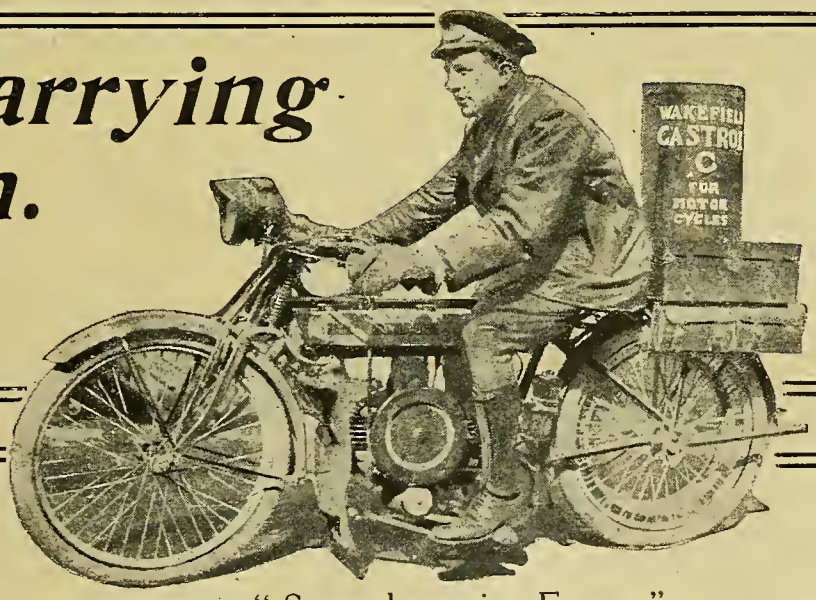

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C.D.C.

MISCELLANEOUS ADVERTISEMENTS.

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ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

☞ DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

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1914 A.B.C., o.h.v. racing engine, spring frame, 2-speed countershaft gear, perfect condition; £40.—47, Pepys Rd., New Cross, S.E. [2980

Abingdon.

1912 3½h.p. Abingdon, 2-speed, handle starter, clutch, h.b.c., good going order; £22/10.—226, Canbury Park Rd., Kingston-on-Thames. [2945

A.J.S.

A.J.S. Spares; prompt delivery — Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305

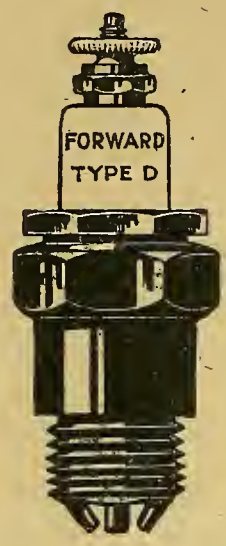
A.J.S., 2¾h.p., 1916 model, 3-speed, excellent condition, lamp, horn, etc.; £40.—Hopkins, New St., Ledbury. [X0516

LATE 1914 6h.p. Twin A.J.S. and sidecar, almost equal new; any trial; £56; lightweight part payment.—Daisy Bank, Matlock. [X0542

A.J.S., 3-speed, 1913-14 model, complete with large business sidecar, excellent condition, lamps, horn, etc.; £57.—Hopkins, New St., Ledbury. [X0514

A.J.S. 6h.p. 1914 Twin Combination, 3-speed countershaft gear, hand clutch, chain drive, nice condition; £50.—Eaton Garage, 3, Elizabeth St., S.W. [X0564

2¾h.p. A.J.S., actual winner of the Tourist Trophy, 1914, in perfect condition throughout; £45.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C [0492



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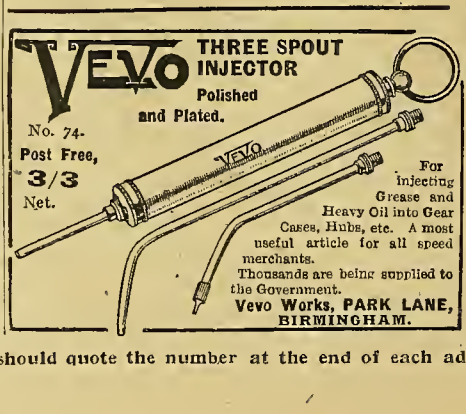
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IMPORTANT NOTICE.

Owing to the Whitsun Holidays, the issue of "The Motor Cycle" for May 31st must be closed for press earlier than usual. All copy and Instructions for Miscellaneous Advertisements in that issue must, therefore, be in our hands not later than first post on Thursday, May 24th.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S., 1915, 3-speed, clutch, T.T. bars, P. and H. head lamps, generator, rear lamp, tools, sound tyres, machine perfect throughout; £43/10.—Advertiser, 156, Gt. Portland St., W.1. [2859

2¾h.p. 1916 T.T. A.J.S., 3-speed countershaft gear, detachable wheels, covered in all chain drive transmission, including speedometer, and all accessories; £45; guaranteed.—Wauchope's, 9, Shoe Lane, London. [3079

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

ALLON, late 1915, 2¾h.p., 2-speed, tyres unscratched; very fast machine; £30, or offer.—Brewster, 58, Wakering Rd., Barking. [3058

ALLON, brand new single and 2 speeds in stock.—Paskell's, 121, High Rd., Kilburn, N.W.6, and 143 Stoke Newington Rd. N.16. [2989

ALLDAYS-ALLON (new), 2-speed, £44/2; 2-speed, hand clutch, £47/5; extended payments arranged.—Service Co., 292, High Holborn, London. [3124

1917 Alldays Allons, 2-speed models; immediate delivery; deferred payments if desired.—Jones, Garage, Broadway, Muswell Hill, N.10. [3018

ALLDAYS Allon, 1917, 2¾h.p., mag., 2 speeds, beauty; 36 gns.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [2998

Alp.

ALP, 2¾h.p. twin, new January, ridden 3 times, no leave, Union Jack disc wheels, 90 m.p.g.; original price £38/12, offers; bought car.—Eric Dower, 17, Sussex Place, Regent's Park, N.W.1. [X0429

Ariel.

ARIEL, 3½h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [2562

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

1917 Ariel in stock for immediate delivery; deferred payments if desired.—Jones, Garage, Broadway, Muswell Hill, N.10. [3019

ARIEL, 1917, 3-speed countershaft model, accessories, milcage guaranteed under 400, everything as new; £60, or near offer.—Cooper, Guestling, Sussex. [2905

ARIEL, 5-6h.p., overhead inlet valve, twin Rex engine, Bosch, Senspray, Kerry clutch, T.T. bars, just overhauled; first £19.—Haslitt, 106, High St., Bexley. [X0580

IMMEDIATE Delivery of new Ariels, 1917 3½h.p. models, 3-speed countershaft gear, chain-cum-belt drive; £69/10 cash, or easy terms.—Wauchope's, 9, Shoe Lane, London. [3087

Auto-Wheels.

AUTO-WHEEL, little used, perfect condition; £7.—West, 14, Drayton Gardens, South Kensington. [2873

WALL Auto-Wheel, good running condition, had little use; £8.—Halse, Holloway St., Exeter. [X0563

WALL Auto-Wheel, just thoroughly overhauled, complete with new tyre; £8/10, bargain.—51, Saxon Rd., Ilford. [X0490

Bradbury.

BRADBURY Combination, nearly new, 3½h.p., spare belt, tyre, tube; £35.—Newman, 85, Chalton St., Euston. [X0559

BRADBURY, 1913, variable countershaft gear, Senspray, thoroughly overhauled, new belt, tyres good, wicker sporting sidecar, spares; £25; photo.—Ward, 20, College St., Irthlingborough, Northants. [X0543

Brough

3½h.p. Brough, twin-cyl. opposed engine, countershaft 3-speed gear, 1915 machine, speedometer, and all accessories; £46.—Wauchope's, 9, Shoe Lane, London. [3088

BROUGH, 1916, fitted with 3-speed countershaft gear, in top-hole order throughout; cheap at £60; extended payments arranged.—Service Co., 292, High Holborn, London. [3118

MOTOR CYCLES FOR SALE.

Brown.

3½h.p. Brown and Sidecar, 2 speeds, handle starting, thoroughly overhauled; £20, or offer; would separate.—Fenton, 313, Kingston Rd., Wimbledon. [2877

B.S.A.

B.S.A. New 1917 Models H and K actually in stock. —Moss, Wem. [2388

COLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888

B.S.A., 1917, latest models in stock; immediate delivery.—Paskell's, 121, High Rd., Kilburn, N.W.6. [2987

B.S.A., 4½h.p., 1916, all chain drive, Millford coachbuilt sidecar; £60, or near.—A.B., Foley, Clifford Rd., New Barnet. [X0532

1917 B.S.A. Combination, lamps, and mechanical horn, 10 gallons petrol; £69.—4, Thornton St., Kempston, Bedford. [3050

1912 Clutch Model B.S.A and accessories, in good condition; £24; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [2923

1916 B.S.A., 4½h.p., 3-speed, all chain drive, lamps, etc., in very good condition; £56.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0481

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in belts, as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529

1912 B.S.A., free engine, lamps, dropped frame, enclosed Bosch, new Dunlops and belt, excellent condition; £25, or nearest.—Ginns, Carleton, Carlisle. [2929

B.S.A. Motor Cycle and Sidecar, excellent condition, 1913, 3½h.p., 2-speed, just been overhauled at works; what offers? Apply, Birch's Garage, Stafford St., Walsall. [X0561

1917 B.S.A.'s, Model H actually in stock for immediate delivery; deferred payments if desired; Canoelet B.S.A. sidecar for immediate delivery.—Jones, Garage, Broadway, Muswell Hill, N.10. [3020

1912 3½h.p. 2-speed B.S.A., appearance as new, tyres almost new, canoe-shaped wicker sidecar, complete outfit, in perfect condition; £28, cash only.—The Premier Motor Co., Aston Rd., Birmingham. [3099

B.S.A., 4½h.p., late 1914, 3-speed, chain-belt, with sidecar, fitted with lamps, speedometer, horn, reliable and fast machine, mechanical condition good, excellent tyres.—Daniels, Coombe, Hawkinge, Folkestone. [X0547

LATE 1914 B.S.A., 3-speed countershaft, powerful and reliable machine, excellent mechanical condition, with sidecar, lamps, horn, speedometer, etc.; best offer over £45 secures.—Bell, Highlands, Lyminge, Folkestone, Kent. [X0546

Calcott.

CALCOTT, 2¾h.p., in good order, new Grado gear just fitted; £20.—Crisp, Goodwins Rd., King's Lynn. [X0334

Calthorpe

COLMORE Depots, Birmingham, Manchester and Liverpool, for Calthorpe motor cycles. [0799

CALTHORPE-J.A.P.'s are in stock at Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [2951

CALTHORPE-J.A.P., 2¾h.p., late 1915, 2-speed, splendid condition; £25, or nearest offer.—Redding, Mill St., Berkhamsted. [2904

CALTHORPE, single and 2 speeds, also few shop-soiled at bargain prices.—Paskell's, 121, High Rd., Kilburn, N.W.6, and 44, Finsbury Pavement, E.C.2. [2988

CALTHORPE-J.A.P., 1915, 2¼h.p., 2-speed Enfield gear, Miller lamps, Lucas horn, speedometer, tyres nearly new, butt-ended tubes and spares; £26.—34, Willoughby Park Rd., Tottenham. [2893

CALTHORPE, 1912, 3½h.p. Precision engine, Armstrong 3-speed gear, clutch, kick starter, Dunlop tyres, Millford sidecar, with cane body, head lamp, tail lamp, horn, and sidecar lamp, recently overhauled by makers; £27.—The Premier Motor Co., Aston Rd., Birmingham. [3100

Chater-Lea

CHATER-LEA and Coachbuilt Sidecar, 6b.p. twin, clutch model, requires slight repair; bargain, £28, or offer.—Red Deer Garage, South Croydon. [2938

Chater-Lea-Jap.

CHATER-LEA No. 7 Combination, 8h.p. J.A.P., coachbuilt sidecar, in perfect condition, recently overhauled and enamelled; bargain, £60.—Seen 58, Bridge Rd., Battersea. [2986

Clyde.

CLYDE, 1914, 3h.p., Bosch, B.B., good tyres, excellent order; trial; £13.—H., 86, Battle Rd., Belvedere, Kent. [X0484

Clyno.

CLYNO, 6h.p., 3-speed countershaft, coach combination, detachable and spare wheels; £69/10.—Motor Exchange, Horton St., Halifax. [2954

CLYNO 1915 Sporting Machine, 2¼h.p., mag., disc wheels; £28/10.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [2999

CLYNO War Office Combinations for immediate delivery from Colmore Depots, Birmingham and Manchester; inclusive price with spare wheel 100 gns. [0884

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ABSOLUTE ECONOMY, FLEXIBILITY, AND EFFICIENCY, CAN BE ATTAINED BY MEANS OF ONE CARBURETTER AND :: :: :: ONLY ONE :: :: ::

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THE Binks Carburetter has three separate and distinct jets operated by a single control lever. As you open the lever, these jets, and their corresponding air supplies, open one after the other. That's its secret in a nutshell; perfect design and manufacture do the rest. You can run in traffic dead slow, REALLY dead slow; move the lever a little and instantly your engine responds like a live thing. Get on a clear road and open wider, and you shoot away, the other jets opening in turn, each providing a mixture of exactly perfect proportions — it can't be wrong. Whatever the position of the lever, you are not using a drop more petrol than is absolutely necessary to keep you going. There is a second lever, which, opened when running down hill, lets a free flow of cold air sweep your cylinder clean, and acts as a good engine brake, too, when you want it. No other carburetter will do this—try it and prove for yourself. We'll return your money if you don't agree after a month's trial, less examination fee. See terms.

Special models for Scott, Douglas, Williamson, and Triumph, and for all Twins.

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Complete with 6 spare jets, key, and full instructions. Box, packing, and postage, 1/6.

Send for my practical "Treatise on Carburation," free.

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IT ISN'T THE PETROL YOU ACTUALLY BURN THAT RUNS AWAY WITH THE MONEY—IT'S THE PETROL YOUR CARBUR- :: :: ETTER WASTES :: ::

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MOTOR CYCLES FOR SALE.

Connaught.

1914 Connaught, 3 speeds, complete, lamps, etc.; £20.—Cross, Agent, Rotherham. [X0531

1915 Connaught, 2-stroke, 2¾h.p., perfect condition; £16/10, offer.—35, Colwell Rd., E. Dulwich. [3009

CONNAUGHT, 3h.p., bought October, 1916, not done 200 miles; £32.—Moore, Poplar Grove, Stockport. [X0329

Coventry Eagle.

COVENTRY Eagle 1916 Twin, sidecar combination, 3-speed countershaft; £69/10, or exchange for Morgan.—Holdsworth, 22, Belvoir Gardens, Halifax. [2953

COVENTRY Eagle (new), Model No. 1, 35 gns.; Model No. 2, 42 gns.; extended payments arranged.—Service Co., 292, High Holborn, London. [3125

COVENTRY Eagle, 1917, 2½h.p., 2-stroke, 2-speed, F.R.S. 2-gn. electric head lamp, electric rear lamp, all spares; seen any time.—Bingham, 2, Kingswood Rd., Upper Norwood, S.E. [3013

Dalm.

DALM, 1915, 2-stroke, T.T., race machine, guaranteed condition; £20.—51, Maplethorpe Rd., Thornton Heath, S.E. [3091

Douglas.

1917.—Gibb, Douglas Expert, Gloucester, for earliest deliveries of The Motor Cycle. [X8510

1915 Douglas, 2 speeds, complete, Lucas lamps, etc.; £45.—Cross, Jeweller, Rotherham. [X0529

1914½ T.T. Douglas, 2 speeds, accessories, fast, and perfect condition; £33.—40, Station Rd., Barnes. [2943

DOUGLAS 1914, 2¾h.p., 2-speed, lamps, horn, etc.; £34/10.—Motor Exchange Horton St., Halifax. [2955

1914 Douglas, 2¾h.p., 2-speed, footboards, accessories; £36/10.—Blake, 216, Westbourne Grove, W. [3046

1912-13 Douglas, single-speed, countershaft, Bosch, overhauled, spares; £21.—Dugdale, Radford, Coventry. [X0482

1914 Douglas, 2¾h.p., 2-speed, T.T. Model, fast, and good condition; £32.—2, Abbey Court, Abbey Rd., N.W.8. [2913

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

DOUGLAS, 1915, 3-speed, T.T., perfect condition; £40.—Wells, Central Garage, Woodford Green. 'Phone: 14 Woodford. [2991

1913 Douglas, overhauled, a sound proposition; £37; extended payments arranged.—Service Co., 292, High Holborn, London. [3115

1915 2¾h.p. T.T. Douglas and accessories, in good condition; £42/10; seen any time.—Bounds, Garage, 223, High Rd., Kilburn. [2922

DOUGLAS, 1914 2 speeds, kick start, foot clutch, all accessories, including speedometer; bargain, £37/10.—Box 223, "Observer," Harrow. [3067

1911 2-speed 2¾h.p. Douglas, in very good order and condition; deferred payments if desired.—Jones, Garage, Broadway, Muswell Hill, N.10. [3021

1914 2¾h.p. 2-speed Douglas, head lamp, rear lamp, horn, new Amac fitted, in grand going order; £35.—Harold Clough, Park Rd. Bakery, St. Helens. [X0324

DOUGLAS, 1915 Model, 2-speed, head lamp, generator, rear lamp, tools, condition of machine splendid throughout; £43.—Advertiser, 136, Gt. Portland St., W.1. [3096

DOUGLAS, 1913-14, 2-speed, T.T., tyres nearly new, new pistons, thoroughly overhauled, everything perfect, accessories; bargain, 30 gns.—34, Ashvale Rd., Tooting. [2996

DOUGLAS, 2¾h.p., 3-speed, clutch, late 1916, practically new, 7 months unused, electric lights; £38, nearest.—Edwards, Builder, Alfred St., Sparkbrook, Birmingham. [X0488

LATE 1913 Douglas, T.T., 2 speeds, lamps, speedometer, Lucas horn, knee-grips, long exhaust, perfect condition; £27, lowest.—436, Whitehorse Rd., Thornton Heath. [3057

DOUGLAS, 2¾h.p. (Dec., 1913), T.T., excellent condition, just overhauled, complete with speedometer, P. and H. lamp, etc.; £27. 'Phone: 646.—King, Chemist, Sutton, Surrey. [3054

DOUGLAS, 2¾h.p., 2 speeds, T.T. and touring bars, fast, splendid condition, tyres as new, long exhaust, Lucas lamps, all accessories; £36.—Powell, Upton Court, Ross-on-Wye. [3064

MUST Sell.—1914 2¾h.p. Douglas, in perfect condition, nearly new Dunlop tyres, all accessories, and long exhaust; owner in France; first £30, no offers.—Mrs. Fletcher, Field Farm, Shipley, Derby. [X0538

HERE'S a Bargain.—Genuine late 1915 2¾h.p. Douglas, 2-speed, T.T., very fast, and guaranteed sound, tyres excellent, 2 lamps, mechanical horn, etc.; must sell; sacrifice £39.—Brown, Gloucester Rd., Chesterfield. [X0570

1915 2¾h.p. W.D. Model 2-speed Douglas, new Dunlop and Hutchinson tyres, mechanical horn, speedometer, lamps, knee-grips, very good condition; £38 cash.—The Premier Motor Co., Aston Rd., Birmingham. [3101

MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS, 1915, 2¾h.p., 2-speed, kick starter, speedometer, lamps, and horn, machine in tip-top order, £45; also 1914, T.T. bars, 2-speed model, £36/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [2949

DOUGLAS Motor Cycles for delivery within 7 days to doctors, farmers, or others that require them for work of National importance.—Eli Clark, The Pioneer Agent, Leader Depot, 223, Cheltenham Rd., Bristol. 'Phone: 4169. Wires: Ignition, Bristol. [X9692

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012

EDMUND-J.A.P., 2½h.p., 2 speeds, the wonderful spring frame machine. We can deliver from stock; price 50 gns.; detailed list free.—The North Wales Motor Exchange, Holt St., Wrexham. [X8755

Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2¼h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

ENFIELD Combination, 1912, £39/10, or exchange.—Motor Exchange, Horton St., Halifax. [2956

ENFIELD 1916 6h.p. Combination, Lucas dynamo lighting; 85 gns.—785, High Rd., Leytonstone. [3107

BIRMINGHAM Controlling Agent, P. J. Evans, John Bright St.—1917 Enfield models actually in stock for immediate delivery.—See below.

1917 3h.p. Enfield, solo or sidecar mount, 2 speeds, clutch, and kick starter; 55 gns.; sidecars from 7 gns.—Below.

1917 Enfield Two-stroke, 2¼h.p., 2 speeds, with free engine, clutch, 42 gns.—P. J. Evans, John Bright St., Birmingham. [X0553

ENFIELD, 3h.p., fitted with all available accessories; £52/10; extended payments arranged.—Service Co., 292, High Holborn, London. [3119

1916 3h.p. Twin Enfield, complete with accessories, exactly as new, guaranteed perfect throughout; £42.—The Premier Motor Co., Aston Rd., Birmingham. [3102

1916 Royal Enfield, 6h.p., fitted with a sidecar, hood, screen, and all available accessories; £90; extended payments arranged.—Service Co., 292, High Holborn, London. [3114

ENFIELD Combination, absolutely new condition; bargain, £70, with all accessories and spare tubes; any trial and expert examination; no offers.—H., 20, Broadway, Westminster. [2944

1916-17 Royal Enfield with dynamo lighting set and double-seater sidecar, most magnificent outfit; £95; extended payments arranged.—Service Co., 292, High Holborn, London. [3111

1917 6h.p. Enfield Combination, better than new, do 200 miles, all lamps, speedometer, etc.; dirt cheap, £90; deferred payments if desired.—Jones, Garage, Broadway, Muswell Hill, N.10. [3025

BRAND New 1917 3h.p. 2-speed Royal Enfield Twin, complete with black lamp, horn, generator, watch, knee pads, not run 100 miles, insurance and petrol; £55.—90, Marlborough Mansions, Cannon Hill, N.W. [2915

ENFIELD (two), 1916, 6h.p. combination, and 1917 8h.p., 2-seater sidecar, all accessories, just come into stock; prices next week or on application.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [2952

ENFIELD, 6h.p., late 1914, coachbuilt sidecar, wind screen, apron, speedometer, lamps, accessories, perfect order; 50 gns.; any trial; some petrol; exchange recent Ford entertained.—Mrs. Williams, Hazelcourt, Seafield Rd., Hove. [2932

HERE'S a Great Bargain.—Genuine late 1913 Royal Enfield 6h.p. C.B. combination, guaranteed sound and perfect condition, all accessories, etc., tyres excellent condition, very fast and powerful; worth £50, sacrifice £45.—Apply, Boult, Hairdresser, Chesterfield. [X0557

ENFIELD 1916 6h.p. Combination, complete with hood, wind screen, and apron, Miller head lamp, 2 generators, tail and sidecar lamps, Watford speedometer, Lucas horn, Euk starter, excellent condition; £85; trial by appointment.—Ward, 96, Dora Rd., Wimbledon, S.W. Tel.: 320. [2884

Excelsior.

EXCELSIOR, 8h.p., 2-speed, and racing sidecar; £48.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [2684

AMERICAN Excelsior, 7-9h.p., 1916-17 model, 3-speed countershaft, mechanical lubrication, Millers lamps, Firestone non-skid tyres, etc., together with Phœnix 20 gn. handsomely upholstered specially built sidecar, fully equipped, both purchased end August last, original receipts given, unused owing to Government position, not ridden 600 miles, all tyres guaranteed unpunctured, wonderful power and speed, 55 m.p.g. Taxihus; any trial, any load; nearest offer to £80 secures.—Address, Shaw, 200, Upper Kennington Lane, London, S.E. [3094

We undertake to

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any of our machines, within six months, at definite fixed charges, which work out at from 13s. to 30s. per week, for the use of the machine, according to time kept. We can also probably solve the problem of your FUEL SUPPLY, and, in addition, all our machines are GUARANTEED. If there is anything else that hinders you from buying, let us know—we can probably overcome it. We undertake Exchanges, but NOT Easy Payments.

Selection from 100 Machines in Stock:

TWO-STROKES.

ALLDAYS ALLON, 1916, 2-speed, perfect.. 29 gns.
CLYNO, 1916, single-gear ..... 23 gns.
CLYNO, 1916, 2-speed ..... 28 gns.
ENFIELD, 1916, 2-speed, clutch ..... 31 gns.
IVY, 1915, 2-speed ..... 23 gns.
JUNO-VILLIERS, 1917 ..... 21 gns.
OMEGA, 1914, 2-speed ..... 17 gns.
OMEGA, 1916, 2-speed ..... 24 gns.
RADCO, 1915 ..... 17 gns.
JAMES, 1916, 2-speed ..... 29 gns.

N.B.—We can supply Featherweight Watsonian to suit any of the above at 3 gns.

SIDECAR COMBINATIONS.

ALLDAYS MATCHLESS, 4 h.p., clutch, 1914, coachbuilt ..... 28 gns.
BRADBURY, 1913, 4 h.p., 3-speed, underslung cane ..... 28 gns.
CHATER-LEA, 1913, 8 h.p., J.A.P., underslung coachbuilt ..... 43 gns.
INDIAN, 1915, 5 h.p., 3-speed, sporting canoelet ..... 53 gns.
QUADRANT, 1914, 4 h.p., 3-speed, underslung cane ..... 33 gns.
QUADRANT, 1913, 4 h.p., 3-speed, underslung cane ..... 29 gns.
ROLFE-PRECISION, 1914, 8 h.p., 3-sp., all-chain, underslung coachbuilt ..... 43 gns.
TRIUMPH, late 1914, 3-speed, coach Sidecar, very fast ..... 47 gns.
WILLIAMSON, 1914, coachbuilt, 8 h.p., 2-sp. 53 gns.
HARLEY-DAVIDSON, 1916, 7-9 h.p., 3-sp., coach Sidecar, run under 1,000 miles; cost £120 ..... 79 gns.
SUNBEAM, latest 1916, 8 h.p., M.A.G., 30 gn. Sidecar, mileage 3,000; cost £140; Lucas accessories ..... 109 gns.
ZENITH-GRADUA, 8 h.p., 1914, sporting Phœnix coach Sidecar ..... 43 gns.

N.B.—Most of the above can be sold without Sidecar.

SOLO MACHINES.

BRADBURY, 1913, 2-speed, clutch..... 23 gns.
BRADBURY, 1913, 3-speed, clutch ..... 22 gns.
B.S.A., 1913, 2-speed, clutch ..... 29 gns.
CALTHORPE, 1915, 2-speed, clutch ..... 21 gns.
DOUGLAS, 1913, T.T., 2-speed ..... 29 gns.
DOUGLAS, 1914, T.T., 2-speed ..... 32 gns.
ENFIELD, 1915, 3 h.p., 2-speed ..... 32 gns.
ENFIELD, 1916, 3 h.p., 2-speed ..... 43 gns.
GRANDEX-PRECISION, 4 h.p., T.T., 1917, brand new ..... 29 gns.
INDIAN, 1915, 7-9 h.p., T.T., clutch ..... 37 gns.
INDIAN, 1913, 7-9 h.p., 2-speed, clutch ... 32 gns.
JAMES, 1913, 4¼ h.p., 3-sp., countershaft . 32 gns.
NEW IMPERIAL, 1915, 2-speed ..... 24 gns.
N.S.U., 1914, 3 h.p. twin, 2-speed, clutch .. 19 gns.
PILOT, 1914, 4 h.p., 3-speed, clutch ..... 22 gns.
PREMIER, 1912, 3½ h.p., standard ..... 17 gns.
RUDGE, 1912, 2-speed, clutch ..... 22 gns.
RUDGE, 1913, T.T., clutch ..... 19 gns.
RUDGE Multi, 1913 ..... 27 gns.
RUDGE Multi, 1917, as new ..... 52 gns.
NORTON, 1914, T.T., Philipson ..... 37 gns.
TRIUMPH, 1911, standard ..... 18 gns.
TRIUMPH, 1913, T.T. ..... 24 gns.
TRIUMPH, 1913, T.T., clutch, re-enamelled 27 gns.

N.B.—We can supply Sidecars ex stock from 2 gns. to suit most of the above.

See Miscellaneous column to-day for Machines up to £20.

LIGHT CARS.

Grand Prix **MORGAN,** 1914 (late), electric lighting ..... 89 gns.
CARDEN MONOCAR, 1914, 5-6 h.p. J.A.P. 49 gns.
MORRIS-OXFORD, 1913 ..... 119 gns.

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F.N.

1911 5-6h.p. F.N., new gears, tank, bars, Amac, frame dropped, everything in top-hole condition; no petrol; £12.—Gill, 32, Derwentwater Rd., Acton. [X0552

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HARLEY-DAVIDSON Model 11F, 1915, unused, 3 speeds, 2 brakes; cash £68/5.—Bond, 245-247, Euston Rd., N.W. [2909

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HARLEY-DAVIDSON 1917 Models in stock: 17/F, price £93; 17/J, price £102. Exchanges and gradual payment terms quoted.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0480

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HARLEY-DAVIDSON Electric Model, with their best sidecar, £126/10; Harley-Davidson, not electrically equipped, with their second best sidecar, £115/10; and the plain model with T.T. handle-bars and Swan cigar sidecar, £117/10; solo mounts £93 and £102; actually in stock; deferred payments by arrangements; demonstrations with pleasure.—Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N.22. [2947

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HENDERSON Combination (4-cyl.), very fast and flexible, lamps, speedometer, etc., perfect; good trial; had little use, original tyres, show no wear; £80, or T.T. lightweight twin and cash.—Box 929, c/o *The Motor Cycle.* [X0558

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HUMBER, 1912, 3½h.p., 2-speed, handle starting, coachbuilt sidecar, new tyre; £25.—Saunders, 135, High St., Lewisham. [2995

1915 3½h.p. Humber, 2-speed, lamp, horn, mirror, splendid order: any trial; £25.—Neilson, 5, Baulk Place, Kilmarnock. [X0326

HUMBER Motor Bicycle for sale, 3½h.p., 3-speed Sturmey-Archer gear, in thoroughly good condition; 30 gns.—Apply, Chauffeur, The Court, Woolhampton, Berks. [2912

MAY 31ST, 1917.

THE MOTOR CYCLE

ESTABLISHED IN 1903

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Petrol Stories.

STILL the sensational press continues to urge the serious position of our petrol supplies, and still it persists in playing to the gallery by inferring that every motorist on the road has no right to be there, and is using petrol wanted for the Army. The more intelligent reader knows the exact position, and knows well enough that the petrol used by the cars and motor cycles now seen on the road has been officially allotted by the Petrol Control Committee. There is no other way of obtaining petrol except through a Government Department, viz., through the Petrol Control Committee of the Board of Trade.

As clearly showing that a good deal of the nonsense which is being talked is devoid of foundation, we have before us a note issued as recently as Thursday morning last by the Petrol Control Committee, offering to renew a licence for petrol if the owner sent the amount of the licence duty named. This is not a solitary instance; we hear of it from various districts, and we refuse to believe that the Petrol Control Committee would assist in jeopardising a situation which is already serious, by distributing licences at this period, if sufficient petrol were not available.

The fact of the matter is that the daily papers are not playing the game. They know well enough that the only motoring done is officially sanctioned by the Petrol Control Committee. If the position were as serious as the "scare" press insinuates, would a Government Department continue to distribute licences? Of course not! Is it not also reasonable to suppose that the Government have an eye on the licence fees of motor cars and motor cycles? Do these papers realise that if a motorist has no petrol to use in his car or motor cycle he may relinquish his licence at the end of June, and claim the return of half his licence fee? Perhaps the writers of the nonsense to which we have referred will tell us how this loss of revenue to the country would be made up. A motorist already pays dearly for what little motoring is possible nowadays; quite apart from the registration and licence fees there is the 1s. per gallon duty on the already inflated price of petrol.

Substitutes.

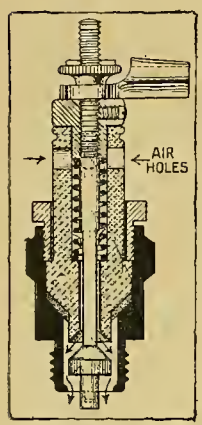
IN these days of stress manufacturers are confronted with many difficulties in the production of new machines. Constantly, owing to the colossal demands of one or other of the sections of the Army and Navy, rumours become rife of a shortage of some particular metal or appurtenance. It can truly be said that in these days adaptability is a virtue. Early in the war, when the magneto shortage was most pronounced, it was seriously suggested that manufacturers should revert to the accumulator and coil system of ignition. Though we never seriously considered such a suggestion, we did think a few months later, when aluminium was so largely in demand with a resultant shortage of supplies, that more use would be made of substitutes—such as cast iron crank cases. Latterly, however, the aluminium difficulty has to a large extent adjusted itself, the latest cry being for ball bearings, of which there appears to be a dearth throughout the world, due to the unprecedented demands of the belligerent nations. Even in this connection, however, a ready substitute is available, for in very many instances a roller bearing could be applied in lieu of a ball bearing, and sometimes (in the opinion of many experts qualified to judge) with improved results. On motor bicycles the roller bearing has every opportunity of succeeding when applied to engine shafts, connecting rods, gearshafts, and hubs. We reviewed in a recent issue a type of roller bearing fitted with success to a leading make of motor bicycle for the last three years, and we throw out the hint in case the position should become still more serious and substitutes a matter of real necessity.

An index to the advertisements in this issue will be found on the page facing the back cover.

IDEAS: Useful and Ingenious.

AN AIR-COOLED PLUG.

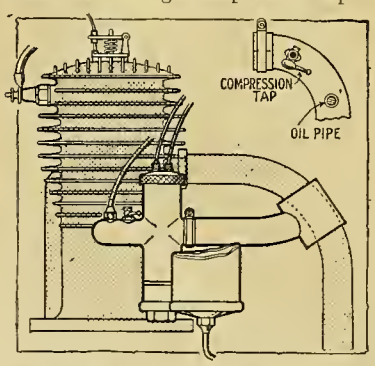
WITH the object of cooling the electrodes of a sparking plug by allowing fresh air to pass through the plug body, Mr. A. B. Back, of Birmingham, has invented and patented the plug illustrated herewith. It will be seen that the central electrode, which performs the duty of a valve and is normally held in position by a spring, is capable of being forced from its seating by atmospheric pressure when the falling piston creates a partial vacuum in the cylinder, and thus a blast of fresh air passes into the engine, cooling the plug on its way. It is, of course, obvious that the carburetter would have to be specially tuned to allow for this extra air which would pass in greater volume when the throttle was closed, or nearly so, than when fully open.



A sparking plug having an automatically operated air disc designed to prevent overheating and carbonising of the sparking points.

A TWO-STROKE TIP.

AN improvement in the petrol consumption and power of two-strokes can be achieved by the following simple device. The fitment is quite easy to make by arranging an elbow between the engine and the carburetter and causing the air inlet to face forward. Drill the elbow in two places, as shown in the sketch, and in one hole fit an oil pipe; in the other a large compression tap.



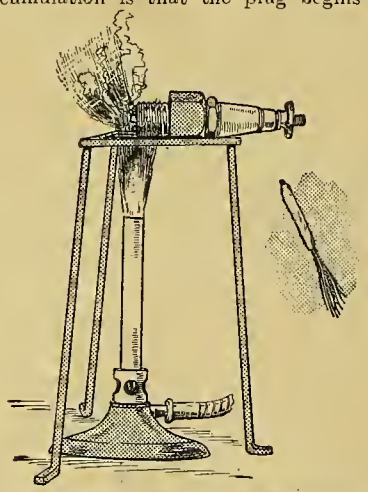
A simple means of heating the carburetter, also showing the extra air device fitted by the writer.

Fit over the air inlet a piece of copper pipe about three inches long and bend towards the exhaust. On the end solder a piece of tin to form a muff round the pipe. The hot air will greatly improve the running, especially on substitutes.

The compression tap on the elbow can be opened as soon as the engine has started making a marked increase in the power and petrol consumption.—EXCELSIOR.

CLEANING PLUGS.

AS the D.R. in "The Critics" once pointed out, two-stroke engines with slip-shod methods of lubrication are very apt to spoil their plugs by the slow accumulation of carbon deposited internally. The result of this accumulation is that the plug begins to short-circuit, and though otherwise sound it very soon has to be scrapped. No amount of washing and soaking in petrol will remove the offending accumulation, but very often a plug can be given an entirely new lease of life by resorting to the following measures:



Very often a discarded plug can be made serviceable by treating it to the flame of a gas burner.

Heat the body of the plug, as shown in illustration, till flame and smoke cease to issue from its interior, then allow plug to cool. Next, by means of a steel wire brush, thoroughly scour out the interior round the central electrode. The carbon inside will now be dry and brittle, and probably a surprising quantity in the form of flakes and dust will brush out.

The best and most obvious type of brush is the end of a bit of Bowden cable, fretted at the end, as shown in sketch. These little brushes, half a dozen of which can be made in a few minutes by anyone possessing a soldering outfit, are extremely handy in the garage.—CHINOOK.

A VARIABLE JET FITMENT.

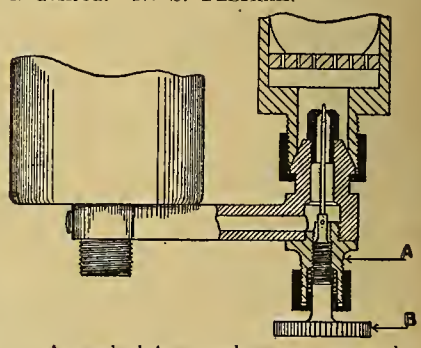
THE advantages of a variable jet are obvious. In these days, with petrol scarce, a great deal of fuel can be saved if, by the simple adjustment of an external screw, placed in a reasonably accessible position, the rider can cut down or increase at will the supply passing through the jet. The arrangement has an additional advantage in that foreign matter obstructing the jet can very easily be got rid of by the expedient of withdrawing the needle nearly to its limit, then flooding. In the majority of cases the rush of petrol then carries away the obstruction, whereupon the needle is screwed back to its original position.

The variable jet here illustrated, adapted to a 1913 Amac carburetter, permits an infinite range of adjustment—from a mixture excessively rich to one so weak that the engine will cease firing. By its use I can thus vary my jet to whatever size may be required, the adjustment being made from the saddle without inconvenience.

By means of the screw B the attached needle is moved vertically in the jet aperture, and it is held on a loose pin joint, so that it can centre itself in the jet and not wear the hole oval by unequal pressure, should the screw happen to be eccentric with the jet. The packing gland A, which is screwed and sweated to the carburetter, prevents all possibility of petrol leakage past the screw.

The jet is a standard Amac, reamered out with sufficient allowance to give an over-large jet when the needle is about two-thirds withdrawn.

This device has been in use on my machine for the past seven months, and has proved entirely satisfactory. It could, of course, be controlled by Bowden cable if desired.—N. S. FELTHAM.



A standard Amac carburetter, converted to a variable jet type by means of an adjustable needle.

Occasional Comments

by "Ixion"

Forging v. Casting.

QUITE a number of the structural fractures sustained in arduous service by British motor cycles during the last three years have occurred in cast parts, which could have been forged at a slight increase in cost. We all know that in ordinary touring work it is a very rare occurrence for a motor bicycle to fracture a part of structural importance, but that sidecar outfits frequently sustain such damage, especially in six days' trials. My Overseas correspondence suggests that solo mounts are prone to fracture rather vital components in Colonial service. These considerations imply that increased use of steel forgings for the vital parts of *(a)* sidecar outfits and *(b)* Overseas solo mounts might justify small price advances after the war.

Oil Leakages.

IT is undeniable that the average motor cycle suffers from oil leaks. A motor cycle capable of restricting its oil to the tank, oilways, and engine interior would not be a bad stunt. There is another important aspect of the matter. Motor cycle engines compare very miserably with good cars in respect of oil consumption. I know the cynics say we ought to describe our engines as "oil cooled" rather than "air cooled," but this is not necessarily the root of the matter. I know our tappets usually pass fresh oil, which has never done its bit, freely over the timing side of the engine and our right leg. Better cooling and even oiling and leakproof tappets are obvious desiderata, and will bring our average of 500 m.p.g. nearer the 2,500 mark. But designers may begin their researches with a much simpler point.

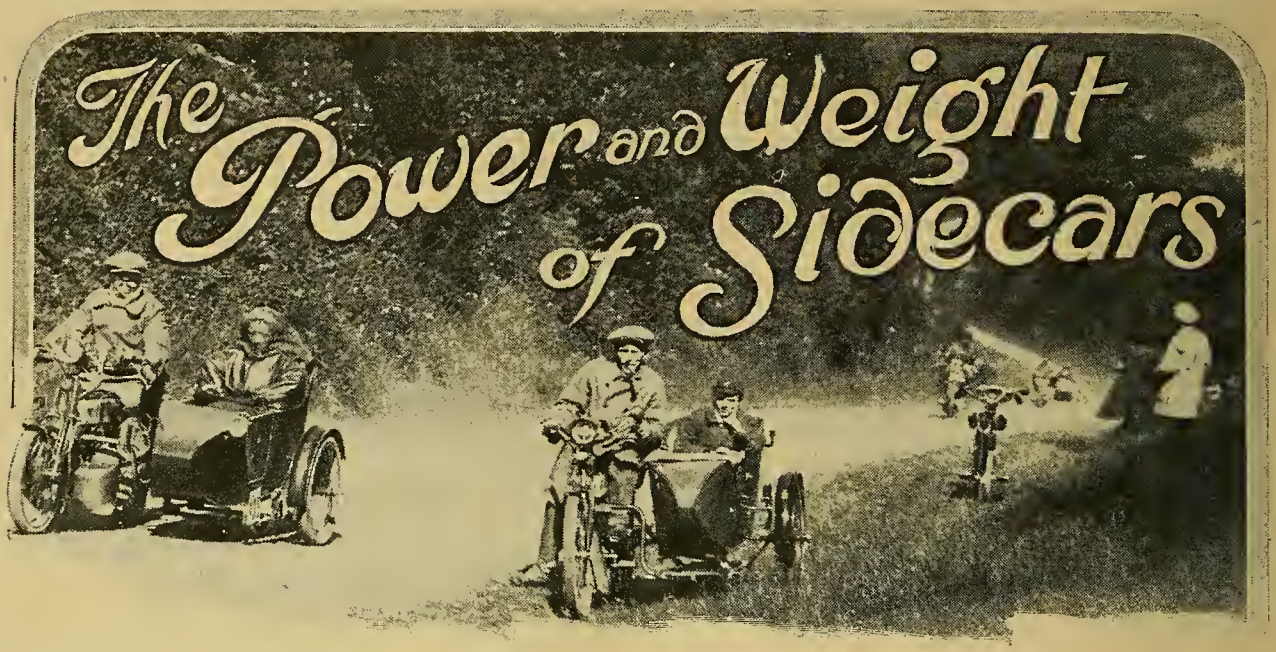
Where Does Wasted Oil Go?

ONE friend of mine owned a machine which had a crank case release valve in the centre of the crankshaft tip on the pulley side. After its efflations of oil had ruined the left boot in every pair he possessed, he fitted a tin deflector plate and deposited the blown-out oil on the roads free of charge to the local authority. But, being a thrifty soul, he afterwards devised a trap to salve this oil, and used it over and over again umpteen times—or so he told me. I recently conducted a much humbler experiment. I was afflicted with a chain-driven machine, the oil thirst of which clamoured loudly for the Turvey Treatment, or some other anti-inebriate dope. I stopped the obvious leakages, which were fewer and less serious than on many machines, baby two-strokes to wit. At last I noticed that the front chain cover was always swimming in oil, and that the oil appeared to leak out along the crankshaft. According to the book of the words, the sprocket end of this crankshaft was fitted with "our ingenious oil retainer," but, being of a sceptical disposition, I resolved to test the fitment. I mopped that well-fitted chain case bone dry: and, without draining the crank case, drove the machine eighteen miles, during which the drip, set according to instructions, passed three pumpfuls into the crank case. Then the chain case was removed, and, behold! it contained rather more than three pumpfuls of clean, sweet oil, evidently still endowed with normal lubricating qualities. This may be an extreme case, though the machine in question is neither juvenile nor undistinguished. But here we have a machine on which a special fitment, *designed to economise oil*, actually pumps the lubricant to waste almost as fast as it is injected. Since the bearings of the engine stand up well in use, and are of a type which is not greedy of lubrication, a trifling alteration might multiply its oil economy by a very large factor indeed. The simple truth is that manufacturers must guard more carefully against dirty and wasteful machines as the public will not tolerate their smell, and owners are cynical about their reformation.

Accessibility Again.

THE last mail brought me a regrettably typical letter from a rubber planter in the Malay States, who rides a British baby two-stroke. The first half of his letter would be printed with glee by the publicity agent of the firm concerned; it is a glowing panegyric of the running qualities of the machine, which two-strokes beautifully over a wide range of speeds, climbs any hill on low gear, and is as reliable as it is economical and pleasant to sit. The concluding portions of the letter deal with accessibility, and are in parts almost unprintable—at any rate, they would land me in a libel action if I gave the name of the firm in question, though they would not get more than a farthing damages, as the facts can be substantiated. The gear box could be lubricated with the aid of the standard tool kit, provided the gear box was dropped; this implied removing the front chain cover, which in turn necessitated taking off the magneto! The sole alternative consisted of forging a very special and complex tool—no easy job on a tropical rubber estate. When the engine first needed decarbonising, the first snag encountered (there were others) was as follows: The cylinder would not lift until the release valve was unscrewed. The release valve could not be unscrewed until its Bowden wire was cast adrift. There were two ways of releasing this Bowden wire; the first was to shear off its nipple; the second was to take off one side link of the spring forks, and twist the cable round whilst the release valve was unscrewed. But the job would have been simple if the designer had either embodied a bolted joint in the control details, or, failing this, if he had brought the cable down clear of the front fork, and allowed a little slack in it. The writer alludes to his standard tool kit as a "bag of electro-plated putty toys," and asks whether all baby two-strokes are as inaccessible. I could inform him of one, though others are fairly unobjectionable.

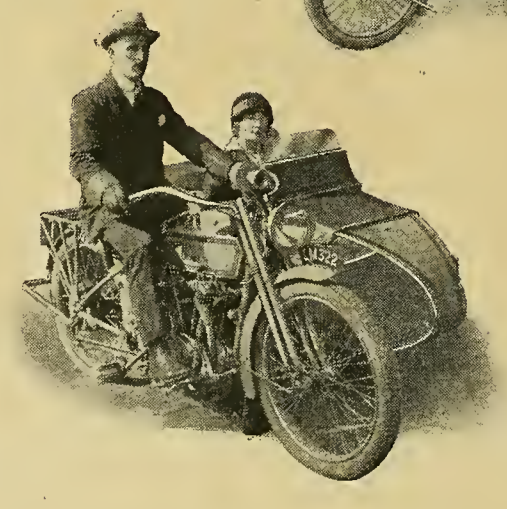
The Power and Weight of Sidecars

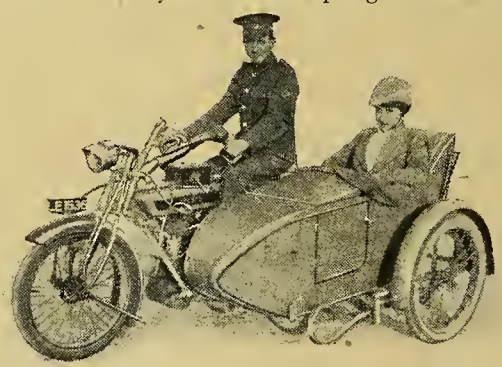


PROMISING FUTURE FOR THE MEDIUMWEIGHT OUTFIT.

EVERY phase of the sidecar question has been extensively dealt with in this journal. The usefulness of the featherweight attachment for low powered machines, and as a winter stabiliser, has been discussed at length, and the advantages and disadvantages of the luxurious outfit, its proper design, and so on, have long occupied the minds of practical riders and writers. But it is customary to consider the matter from the standpoint that there are only three types of sidecar in the running: (1) the lightweight attachment, which can be attached or taken off in a few minutes; (2) the mediumweight touring sidecar, for attachment to the popular 3½-4 h.p. single; and (3) the heavyweight, for attachment to the 6 or 8 h.p. twin. The latter is considered as a permanent fixture, and, being such, it does not very much matter, from the point of view of most riders, how much weight be piled on in the way of strengthening tubes, etc.

In the following article my object is not to decry the heavyweight sidecar outfit, which has given excellent service, but merely to discuss the growing possibilities of a type which, while offering the same advantages as the heavyweight, is not unnecessarily heavy and cumbersome





TYPES OF POWERFUL *DE LUXE* SIDECARS.

7 h.p. Matchless and 7 h.p. Harley-Davidson combinations, typical British and American productions.

I use the word "unnecessarily" with due consideration. It is a proved fact that the greater the weight of the outfit the more massive must be not only the connections between the motor cycle frame and the sidecar frame, but also the frames themselves.

In order to reduce the weight of the sidecar outfit, then, one must begin with the motor cycle. The system of attempting to reduce the weight of an outfit by fitting a featherweight sidecar to a heavy machine of 5 or 7 h.p. is entirely wrong. As stated in a recent leader in this journal, the motor cycle and the sidecar must be properly proportioned as regards weight and strength, which brings us back to the point under discussion—that the whole weight of the outfit is decided by the motor cycle. If the motor cycle is heavy, the couplings and frame members throughout must be strong and massive, since half the strains on the sidecar are the result of the work it does in supporting the motor cycle. Thus, as so many have found to their cost, a featherweight sidecar attached to a heavy machine invariably gives trouble as regards couplings, etc., unless it be of exceptionally

The Power and Weight of Sidecars.—

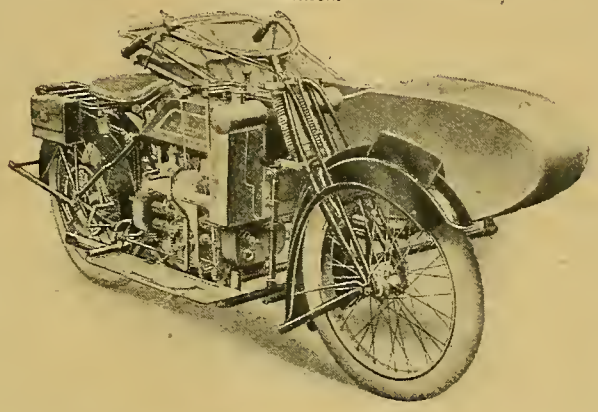
good design and construction. It is invariably difficult to keep in correct alignment, and very often the curved members between the motor cycle and the sidecar frame yield to the strains imposed upon them.

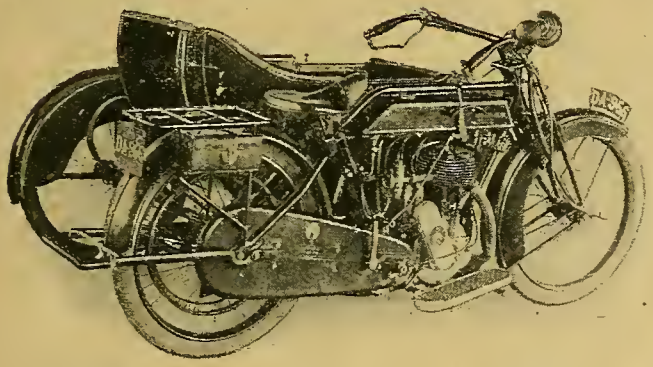
Use a featherweight body by all means, but the sidecar chassis must be proportionate to the motor cycle, the weight of the body and the passenger it carries being one of the least important factors.

While on this point, I have often wondered why many manufacturers, particularly of lightweight sidecars (which call for highly efficient design), employ curved tubes when a straight tube design is equally adaptable. Take, for instance, the front tube connection, which is often arranged as shown in the sketch overleaf with its weak bend, when a straight triangular steel rod connection on the lines also shown would eliminate this weakness.

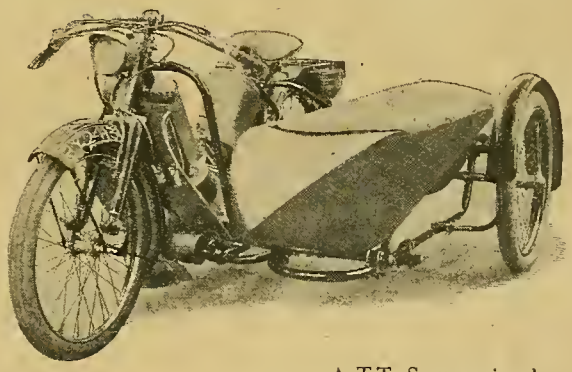
TYPES OF SIDECAR OUTFITS.

A heavy and powerful combination, the 8 h.p. water-cooled Williamson.

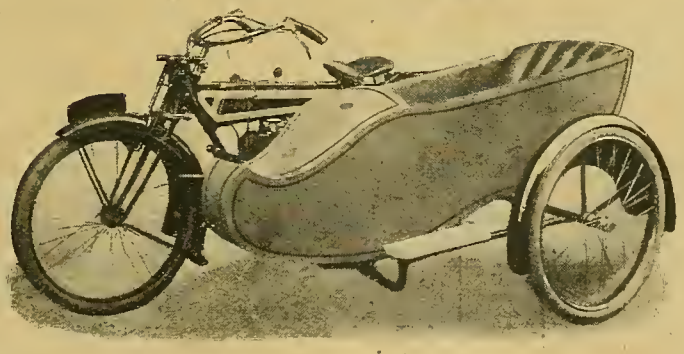




The mediumweight, the type favoured by the writer.



A T.T. Scott equipped with a sporting sidecar body, the chassis representing a reasonable compromise in strength and lightness.



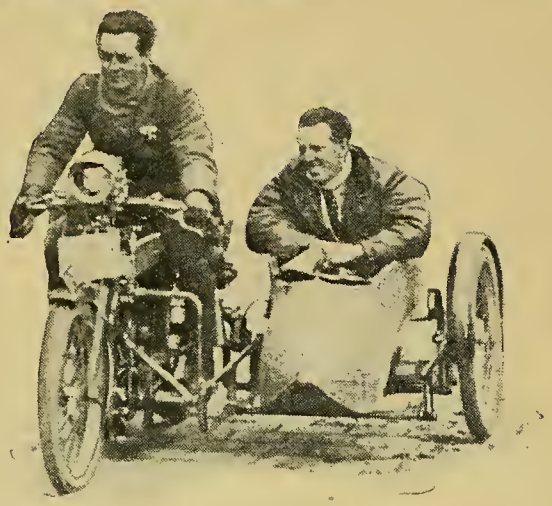
A 2¾ h.p. A.J.S. outfit, to which is attached a Northern featherweight sidecar.

Quite apart from the question of weight there are, however, two other points which enter into the decision. The first of these is power. Nothing tests the strength of sidecar couplings so much as rapid acceleration, chiefly because couplings are so often designed without any thought for this important factor. But acceleration can be met by straight tube design; in other words, 90% of the load thus imposed could, theoretically, be taken by a fine steel wire, placed in the proper position, and in as direct a line as possible between the front portion of the motor cycle and the hub of the sidecar wheel. If, indeed, it were possible to run a steel wire direct from the front wheel hub of the motor cycle to the hub of the sidecar the question of pull need not enter into discussion at all. The second deciding factor, the sweetness of the transmission system, applies chiefly in the case of a single-cylinder machine. A little jerking at low speeds imposes strains upon the sidecar couplings (which, of course, means the sidecar chassis and also the motor cycle frame throughout) equal to "half a mile" of rapid but smooth motion on a machine of double the power. Thus the pull of a 3½ h.p. single with harsh drive would probably impose greater wear and tear on its sidecar and frame than an 8 h.p. twin of the same weight but transmitting a smooth torque.

Rigidity.

Let us take it, however, that in the modern machine all transmission shocks are damped out. We come now to the very loosely used term "rigidity." We do not want rigidity in a sidecar outfit. The more rigid it becomes, the greater the need for strength, which is inseparable from weight—inseparable because we are dealing with an unmechanical machine, which cannot be adapted to straight tube, triangular design (unless we depart entirely from the principles under discussion). Therefore, in entering into the question of present-day machines, I lean towards Dr. Low's idea expressed in *The Motor Cycle* of supple sidecar frames, built on aeroplane lines, having enough give in their members to relieve the whole structure of those terrific breaking strains and jolts which occur on encountering, for instance, a string of pot-holes when taking a right-hand corner—just when all the strain falls

The Power and Weight of Sidecars.—



A 5 h.p. Ariel outfit possessing a strong sidecar chassis but fairly light cane body.

on the sidecar couplings and chassis. But if we have spring frame motor cycles and spring sidecar wheels the complete chassis can be made absolutely rigid—the more rigid the better, for it will then be relieved of the breaking strains imposed by bad surfaces, which are a very considerable factor.

Some Interesting Comparisons.

It is time to get away from the notion that a comfortable body necessitates an excessively heavy motor cycle. This principle is all right so far as it goes, but it is the wrong basis on which to work, for weight necessitates still greater weight. That is, the heavy cycle requires heavy couplings and a heavy sidecar frame to support it, which, in turn, means that the motor cycle frame must be stiffened up and strengthened, and a big powerful engine used to propel the ultimate outfit. It was on these lines that some of the heavy outfits of pre-war days came into being.

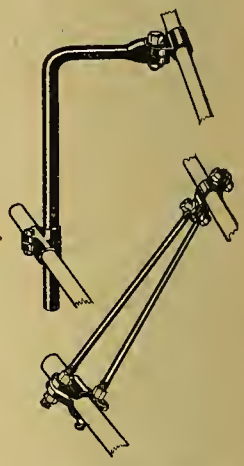
The table given below gives interesting running comparisons as regards weight-h.p. ratios. The two high-powered machines are equipped with all spares and accessories, it being taken that one reason why a rider chooses a machine of this type is that it enables him to carry such refinements.

WEIGHT (FULLY EQUIPPED) PER CUBIC CAPACITY.

Machine.	Weight of Machine.	Weight of Sidecar.	Total Weight with Passengers.	Weight, lb. per cub. cm.
	lb.	lb.	lb.	
7 h.p. electric (1,000 c.c.)	380	300	960	.96
6 h.p. (770 c.c.)	365	275	920	1.19
4 h.p. modern flat twin (620 c.c.)	260	160	700	1.13
4 h.p. T.T. single (550 c.c.)	240	100 (feather-weight)	620	1.12
3½ h.p. touring single (499 c.c.) ..	260	130	655	1.31
2¾ h.p. T.T. single (349 c.c.)	190	95 (feather-weight)	565	1.61

The 7 h.p. outfit of course tips the beam, and is the best powered of the bunch; against it the popular 6 h.p., similarly equipped except for electric lighting set, shows up rather badly. It will be observed that the 4 h.p. T.T. single with featherweight sidecar, and also the 4 h.p. modern flat twin with mediumweight touring sidecar, are both better powered than the popular 6 h.p. heavyweight outfit, while the 3½ h.p. touring single and the 2¾ h.p. lightweight are both obviously overloaded. The figures illustrate the fact that there is very little to be gained in paying for oil, petrol, and tyres for an outfit weighing 640 lb., when one weighing 420 lb. is as well powered.

It may be clear by now that I am advocating sidecar outfits on the lines of the 3½ h.p. Brough or 4 h.p. Douglas, weighing about 230-260 lb., and allowing 100-140 lb. for the sidecar, in preference to the huge 6, 7, and 9 h.p. outfits, the sidecars alone of which may weigh close upon 300 lb. Personally, I would put the minimum h.p. at 4, but we can expect higher efficiency after the war. What is even more to the point than anything else is the fact that, while one type of machine is ideal for solo use, the other is quite hopeless except with its massive sidecar attached.

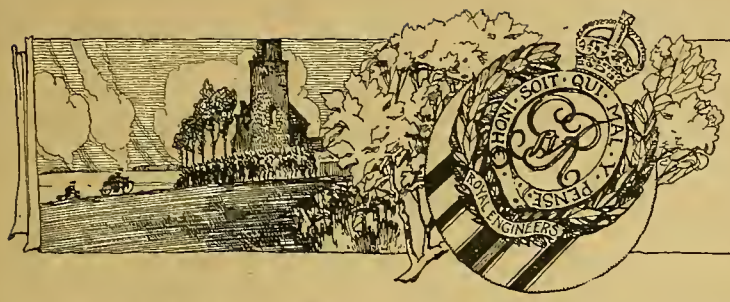


(Top) A common design of sidecar front connection, the weakness of the bent tube being obvious. (Bottom) This weakness could be eliminated by the use of a triangulated steel rod connection.

Some may contend that the modern highly efficient engine does not lend itself well to sidecar work because it will not "slog," but with present-day gear boxes slogging is a thing to be avoided rather than looked for.

An outfit on the lines suggested would probably prove considerably faster on a long journey than a more heavily engined outfit, both carrying weight in proportion with their power, and I firmly believe that the post-war sidecar outfit de luxe will be of the highly efficient mediumweight order—not flimsily light, nor yet unnecessarily heavy. CHINOOK.

A 6 h.p. Enfield sidecar on the road.



MILITARY NOTES.

THE TERMS OF ENLISTMENT.

IN the issue of April 26th last Mr. John Gardner, J.P., of Coventry, brought to our readers' notice the case of his son, Motor Cyclist Cpl. J. S. Gardner, R.E., who enlisted as a despatch rider in August, 1914, at the rate of pay of 5s. per day, and was lately informed by the authorities that he had been overpaid, and was in debt to the Government to the extent of £80 odd. Mr. Gardner now advises us that the War Office has decided that the 5s. per day shall apply to the 8th January last, but in future his son (and others similarly affected) will be held to serve at the ordinary rates of pay.

A MOTOR CYCLIST ON A MOTOR LAUNCH.

A FURTHER letter from Chief Motor Mechanic G. Bell, H.M.M.L., says:

"The weather here (off Malta) is very hot indeed, so you can guess the best place is where I am at present writing this letter, out on the blue Mediterranean, miles from shore, with engines going round like a clock.

"I am very pleased to say that I get my *Motor Cycle* every week, and look forward to its arrival. Plenty of friends out here read your journal at home, and they are round me like a pack of wolves for a look at it, so you see we all take an interest in motor cycling, though we are not able to do any out here. Still, we have got our little engines to look after (500 h.p.). (These are the sort of engines you want for winning hill-climbs.) We get plenty of work from 6 a.m. to 6.30 p.m. and one day in six in port, so we get busy sometimes."

TESTING MOTOR CYCLES IN EGYPT.

ANOTHER interesting letter is to hand from Cpl. Thos. E. Greene, the Rudge T.T. and trials rider, formerly of Dublin. Cpl. Greene is with the A.S.C. in Egypt, and extracts from his last letter are appended:

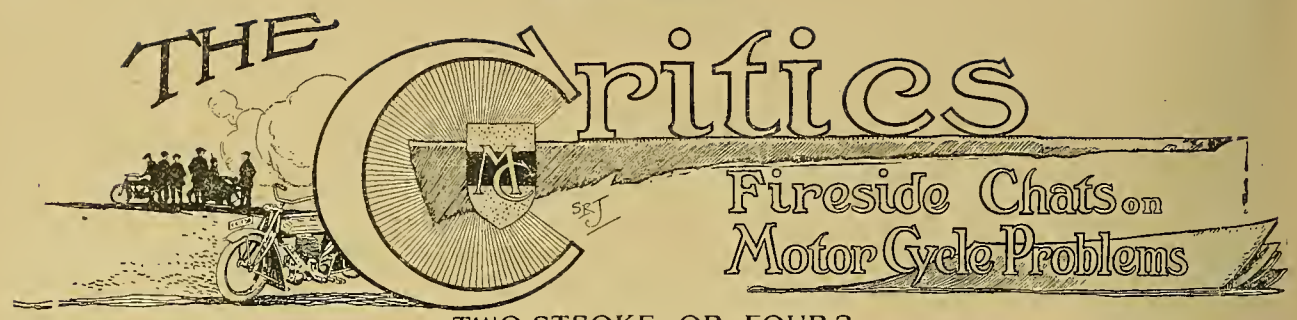
"Things are still going strong with motor cycles in Egypt. As I have said before, this is the ideal spot for motoring as far as weather is concerned. One can always make a date for a run and rely on the weather being of the very best. The roads are the only drawback. There are, one may say, only two decent roads, of about twenty miles in length, outside the city—the others so-called 'roads.' I can tell you that one trial is enough, as it is nearly impossible to hold a machine on them, and, if you succeed, it is a question if the machine will itself hold together. Well, sir, as I mentioned in my last letter, I have the testing of all the motor cycles we overhaul, and I can tell you that they *do* get tested at that, as you will see by the enclosed snaps. The large one shows a couple of Clyno machine gun sidecars 'going through it,' and the other print shows a Triumph doing a jump of 52ft. from the point the wheels left the ground to where the back wheel hit the ground again. It cleared a height of 3½ft. One of my men, Pte. W. Bickle, has jumped 46ft. and a height of 4½ft. to 5ft. on a Douglas (a wonderful performance for a 2¾ h.p.). There is no better machine to ride than the 'Dug'—that is, in the city—and the Triumph is unbeatable for the stranger going outside the city, as any of the despatch riders out here will tell you.

"All letters from friends at home complain of the weather during the winter. I am sure it must have been bad. We have had about half a dozen thaws out here this winter, and we have just seen the season round now, as we got out here just twelve months ago, and I must say the weather is top hole. There is only one thing troubling me, and that is what we expect when we do get back in 'Blighty,' as I am sure it will be 'rotten.'"

TESTING MOTOR CYCLES IN EGYPT AFTER REPAIR.

(Top) Clyno machine gun sidecars being tested by A.S.C. repairers on a rough steep slope.

(Bottom) A Triumph being put through its paces on a steep bank. The jump at the top measured 52 feet, so reports Cpl. T. E. Greene, the winner of the last motor cycle Grand Prix.



TWO-STROKE OR FOUR?

THE Journalist was a man of few words, but he knew how to use them with cutting and convincing effect. He was a pretty long-headed old sage, and he had been known to argue the Manufacturer, whose practical knowledge and experience was far superior, to an absolute standstill—even when he himself and everyone else knew that the Manufacturer was right. The D.R. had a fairly wide general experience in engineering matters, but he was whimsical and given to self-contradiction. The Novice—well, he possessed an unusual gift for starting wrangles, then silently watching the results. It amused him vastly that these three "No. 9 hatters" never agreed unanimously on any single point relating to motor cycles.

"Economy becomes us," observed the last-named, elevating his slippers to the arm of the Manufacturer's chair, "therefore I contemplate selling my touring mount and buying an infant."

"A worthy contemplation," observed the D.R., "no doubt inspired by a certain shortage of petrol."

"No, I have plenty. Now the question is, Which should I buy, a two-stroke or a four-stroke? Recent controversy in the correspondence columns of *The Motor Cycle* has failed to produce convincing evidence on either side."

There was a pause. "I should buy a two-stroke," observed the Manufacturer.

The D.R. glared at him. "I was just going to recommend a four," he stated.

The Novice grinned—under his skin as it were.

The Fun Commences.

"Why a two?" the Novice addressed the Manufacturer.

"Primarily on account of its simplicity. A light runabout should require an absolute minimum of attention, hence simplicity is its keynote."

"So absurdly simple that if anything goes wrong with it you can't find out what it is," observed the D.R., drily. He turned to the Novice. "You say you want to save petrol. Well, I can tell you this—that my present 3½ h.p. solo mount will knock most of the two stroke lightweights sideways on petrol consumption. I call the average baby lightweight a noisy and unwarrantable little sham."

The Novice stroked his waistcoat. "I must say I rather lean towards the four," he stated, "chiefly because I know it and don't know the two. Also there is the irritating fuss the two kicks up ——."

"Petrol consumption and noise aren't the only points," interrupted the Manufacturer. "The two-stroke starts easier than the four, generally pulls better, and requires considerably less attention ——."

"Now that's where I get you," the D.R. pulled him up. "I agree that it requires less attention *if* you are satisfied with periods of four-stroking and so on. To keep a two stroke in perfect trim—that is, always two-stroking—you have a jolly sight more fiddling to do than with the corresponding four-stroke. Why, a single overdose of oil may upset its running for a whole week."

The Novice turned to the Journalist. "What do you think?" he asked simply.

"I agree with everyone so far. The imperfect lubrication of most two-strokes causes plug troubles, irregular running, and so on, but it never actually lets you down. It requires decarbonising more frequently than the four; but, on the other hand, there are no valves to grind in, it is much less complicated, pulls better on hills, is smoother running, and generally more manageable. As regards noise—well, at high speeds the purr of the two is much less irritating than the clatter of the four."

"And as regards cost of maintenance?" queried the Novice.

"I should say the four has it every way."

"Hear, hear," agreed the D.R.

For Long Distance Work.

The Manufacturer turned quietly to the latter. "The Novice has long business rides to perform weekly," he pointed out. "Do you seriously think that he would be more comfortable on these journeys riding a baby four-stroke than on a baby two?"

"If the two-stroke were running perfectly—no. But I contend that in the hands of the Novice it would be four-stroking and six-stroking most of its time, and, consequently, he would be very much more comfortable on a four."

"I remember one ride on a baby four," observed the Journalist. "I swore I'd never take another. The sensation of revs. was appalling! The engine seemed to be bursting its vitals the whole way. The ride tired me out. To-day I often ride a baby two-stroke seventy or eighty miles non stop, enjoying every inch of the journey. I let the little engine take its time, but I maintain quite a decent average, arriving at the other end fresh as a mountain daisy."

"Reverting to the matter of upkeep," pursued the Manufacturer. "Our friends think the four-stroke has it, but I am not convinced. Look here—you talk about the rattle and the sensation of revs. imparted by the four. Rattle and vibration cannot go on without wear and general depreciation. I'd be willing to wager that 1914 two-strokes are on the road and giving excellent service a year—yes, two years—after the 1914 four-strokes are on the scrap heap—or, at any rate, too unreliable for any but village joiners and chimney sweeps. Every four-stroke engine reaches a point when its death warrant for serious work is inevitably served upon it. Now there is nothing to determine the life of a two-stroke. It has no small parts—no working joints of inadequate dimensions to wear out. The good two-stroke engine of to-day will see the cycle parts into their grave, and then, after an overhaul, it will go on driving a lathe for another four or five years."

"After which," observed the D.R., "you fit another new piston and sell it to the sewage farm as a pump."

When an Engine Wears.

The Manufacturer pointed the stem of his pipe at the D.R. "Look here, young man," he said gravely, "I had these things thought out before you were born. I lived near a station, and I noticed, when lying in bed at night time, that the engines pulling out of that station, under load, went out quietly, whereas those entering, with steam shut off, seemed to be clanking themselves to bits. Then I fell to thinking that it is not the work an engine does under load, when all the bearings are close up, which wears it out. It is the clanking of the reciprocating members when the load is released that destroys it! So it is in the case of the two-stroke and the four-stroke. In the two-stroke the piston always has pressure behind it, which keeps the bearing faces up to their work. In the four there is one stroke—the induction—during which the bearing pressures are entirely reversed, and it is during this stroke—non-existent in the two-stroke—that the damage occurs."

"You mean," observed the Journalist, "that wear does not occur so rapidly in the two as in the four, and that when it does occur it does not much matter?"

"Exactly. I mean this. The two-stroke may use more fuel, but that is counterbalanced by the fact that one can postpone overhauling, which one cannot do in the case of the four-stroke."

"I agree," said the D.R. "When you have perfected the lubrication of the two-stroke engine, you will partly have solved the problem of its high consumption. Good-night, gentleman." The D.R. took up his cap and strode out.

"Which are you going to buy?" asked the Journalist of the Novice.

The Novice shook his head sadly. "Blowedifino," was his conclusion.

PETROL AND THE PRESS.

THE DAILY PRESS CAMPAIGN AND "TRUE ECONOMY."

FOR some unaccountable reason a certain section of the daily press, to which we have regularly referred, has made a dead set against private motorists, or as they are referred to by these journals, "pleasure" motorists, and by the impartial criticisms levelled one might be led to suppose that motorists as a body are besporting themselves in a way that their sense of patriotism should forbid. We are not out to defend the true pleasure motorist, any more than we are out to defend those who support other unnecessary luxuries in war time, such as the visiting of costly hydros so widely advertised by the same daily papers, but pleasure motorists are few and far between, and therefore these unwarrantable attacks serve no useful purpose. The allotment of petrol is decided by the Government, and there are thousands of motorists who, anxious to economise in every possible way, have contrived to use the petrol allowed them at a slower rate than their permits specified, with the result that they still have a little to draw on their cards, and this they are using only as necessity arises. It is manifestly unfair that they should be contemptuously alluded to as "petrol hoarders," "unpatriotic joy riders," and so on, for as regards economy they have done much more than those who used up their petrol as it fell due, now store their vehicles.

Why the motor cyclist should be included in the general category of abuse it is difficult to say, for the amount of petrol his machine consumes is negligible compared with the service it renders as a business medium. If sidecars were used where possible by the army instead of luxurious four-seater cars, more petrol could be saved than is consumed by the net total of so-called pleasure motorists. It would then be unnecessary for military drivers to leave their engines running for long periods in order to save the trouble of cranking, and we would suggest that if the section of the daily press concerned turned its attention in the direction of military and munition circles, it would find a more fruitful field for activity. We repeat, petrol distribution is in the hands of the Government, not the daily press, and if the latter is sincerely anxious to advance economy, why not kick off by backing the Government and turning down advertisements enticing people to use the railway?

We remarked in a recent issue that many great factories were turning out motor cycles by the hundred for Russia. The photograph shows a batch of Sunbeam 5 h.p. and 8 h.p. twin-cylinder machines, part of a large consignment produced to the order of the Ministry of Munitions for the Russian Army.

CURRENT CHAT

SPECIAL FEATURES

POWER AND WEIGHT OF SIDECARS.
OVERSEAS NOTES AND LETTERS. IMPORTS TO AUSTRALIA.

TIME TO LIGHT LAMPS

SUMMER TIME.

May 31st	... ...	9.33 p.m.
June 2nd	... ...	9.36 ,,
,, 4th	... ...	9.38 ,,
,, 6th	... ...	9.40 ,,

For the Gallery—Exclusively.

The "sensational" press is still voicing the old war cry, "No Petrol for Pleasure." This sort of thing may please non-motorists, but it certainly does not interest those concerned, as pleasure motoring ceased voluntarily long ago. We thought, moreover, that it was common knowledge that no petrol licences have been renewed, except to those who, in the judgment of the Petrol Control Committee, have important use for their machines, and that "no petrol for pleasure" has now been in force some weeks.

Motor Cycles and other Sports.

Motor cycles appear to be even more freely used in the States as adjuncts to other sports than they are in peace days here, for scarcely an issue of our American contemporaries goes by without illustrations of the motor cycle on the game fields or located by some angler's paradise. Often the spoils of the chase, a deer, or smaller game, are shown loaded in the sidecar, from which a brace of rifle barrels protrude ominously; or perhaps the angler is shown alongside the machine with his catch of gigantic lake trout. Such glimpses of the true outdoors are very refreshing in these strenuous days.

How the Motor Cyclist is helping Uncle Sam in the War.

The return of the various bodies of national guardsmen of the United States Army from duty on the Mexican border is drawing attention to the very general use now being made by Uncle Sam of the motor cycle. According to official advices, men entering the army at any usual recruiting station and indicating, under the heading of occupations, that they wish to join as motor cyclists, are apt to be assigned to the quartermaster's department or else to signal corps. Both these divisions make use of the motor cycle, the machines, of course, being furnished by the Government. In either case the service is very nearly identical—that is, the carrying of messages over short distances when the wireless or telephones may be otherwise employed. In the signal corps, in addition, the motor cycle men are often sent out to find where some wire may have been cut, or broken, in the communication service, and to repair the break as best they can. Most of the men receive the rank of sergeant, and draw a pay of $36 a month.

Sidecar Weights.

Writing in this issue, "Chinook" suggests that an all-round reduction in the weight of sidecar outfits is chiefly a matter of proportion, the weight of the motor cycle being the chief factor concerned. There is no denying that very little science has been applied in sidecar design, and after the war there will be a general move in the direction of weight reduction.

A Motor Cycle fitted with a Wireless Telephone.

The United States Signal Corps is now using a wireless telephone for the purpose of communicating with aeroplanes. The current is generated by the engine of a motor bicycle, the rear wheel of the machine being jacked up and used as a means of driving the dynamo. Carried on the machine there is a collapsible aluminium mast about 5ft. high, which telescopes in a manner similar to a fishing rod. It is so light that it weighs only 2 lb. The actual aerial is made of thin aluminium wire, and is of the latest spiral construction interlaced with silk cord, so that it also can be made collapsible, and when not in use it folds up into a very small space. The earth wire is connected to an aluminium tube, and this is driven into moist ground or earth. The actual instrument is attached to the rear carrier of the motor bicycle, and does not weigh more than 12 lb. An American contemporary in describing the device states that there should not be any reason why the complete outfit should take more than one and a half minutes to get ready and working, including erecting the aerial, starting the generator, and testing.

An American National Guardsman of the U.S.A. Army recently returned from the Mexican border.

70,000 Army Motor Cyclists.

There are nearly 70,000 motor cyclists in the British Army, according to Staff-Captain L. Keene; 40,000 of these are despatch riders, the remaining 25,000 or 30,000 motor cyclists are in machine gun batteries, signal corps, and convoy service.

Average Prices.

We give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the figures for the preceding five weeks. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C.	1914	3½ 2-speed	£40	—
A.J.S.	1916	6 combination	—	£96
,,	1914	6 combination	£53	£56
,,	1916	4 combination	—	£85
Allon	1916	2¾ 2-speed	—	£32
,,	1914	2¾ 2-speed	—	£28
Ariel	1915	3½ 3-speed	—	£45
,,	1914	5-6 combination	—	£52
Bat	1914	6 3-speed	—	£48
Bradbury	1914	4 2-sp. sidecar	—	£43
Brough	1916	3½ 2-speed	£60	£57
,,	1915	3½ 2-speed	£45	—
B.S.A.	1916	4½ sidecar	£58	£58
,,	1915	4½ sidecar	—	£56
Calthorpe	1916	2½ 2-speed	—	£34
,,	1915	2¾ 2-speed	£26	£24
,,	1916	2¾ 2-stroke	—	£29
Clyno	1915	2½ 2-stroke	£26	£28
,,	1914	6 combination	—	£65
Connaught	1915	2¾ 2-stroke	£24	—
Douglas	1916	2¼ 2-speed	£58	£47
,,	1915	2¾ 2-speed	£42	£43
,,	1914	2¾ 2-speed	£34	£35
Enfield	1916	6 combination	£88	£78
,,	1915	6 combination	—	£61
,,	1916	3 2-speed	£42	£45
Excelsior	1915	8 2-speed	—	£48
H.-Davidson	1916	7 combination	£75	£81
,,	1915	7 combination	£65	£68
Henderson	1916	7 combination	—	£100
Hazlewood	1914	6 3-speed	—	£39
Humber	1915	6 combination	—	£65
Indian	1916	5 combination	—	£57
,,	1916	7-9 combination	£80	£76
,,	1915	7-9 combination	£60	£63
James	1916	4½ combination	£65	£64
,,	1916	2-speed, 2-stroke	£33	£32
Levis	1916	2½ Popular	£28	£25
,,	1915	2¾ Popular	£22	£22
Matchless	1915	7 combination	£60	£74
New Hudson	1916	2-stroke, 2-speed	—	£28
,,	1915	4 combination	—	£48
New Imperial	1916	2½ 2-speed	—	£31
,,	1915	2½ 2-speed	£25	£24
Norton	1916	3½ 2-speed	£60	£47
,,	1915	3½ T.T.	£45	£45
O.K.	1916	2¾ 2-stroke	—	£22
P. & M.	1915	3½ combination	—	£65
,,	1914	3½ combination	£52	£55
Premier	1915	2½ 3-speed	—	£28
,,	1914	3½ 3-speed	£46	£46
Rover	1916	3½ 3-speed	—	£51
Royal Ruby	1916	2¾ 2-stroke	£19	£28
Rudge	1916	3½ Multi	—	£45
,,	1915	3½ Multi	—	£40
Scott	1916	3½ combination	—	£60
Sun	1915	2½ 2-speed	—	£24
Sunbeam	1916	8 combination	£114	£100
,,	1916	3½ solo	—	£70
,,	1915	3½ combination	£84	£78
Triumph	1916	2-speed, 2-stroke	£35	£39
,,	1915	4 countershaf	—	£53
Velocette	1915	2¼ 2-sp., 2-stroke	£25	£25
Zenith	1915	8 Gradua	—	£62

Petrol for Newspapers.

We notice that petrol can be supplied "for the conveyance of newspapers for distribution." Is this why certain newspapers are so very perky as regards the petrol question?

Gear Boxes for Russian Machines.

Some of our readers perhaps noticed that the Russian military model Royal Ruby, fully described in our issue of May 10th, is equipped with the A.J.S. three-speed gear box and clutch unit, in combination with the Royal Ruby patent eccentric adjustment.

An Overseas Specification.

A rider from India, now on home furlough, comments favourably upon the specification laid down by the Russian War Ministry, and states that, immediately conditions permit, he is having a Russian military twin sent out to him in India.

What he didn't know.

Because Sir Albert Stanley stated in the House of Commons that the Board of Trade has taken control of petrol, a writer jumps to the conclusion that "the control of motor spirit has been definitely taken out of the hands of the Petrol Control Committee." That writer will be interested to learn that the Board of Trade *always* controlled petrol, for the Petrol Control Committee is a department of the Board of Trade. Reference to any petrol licence will prove this.

Consistency!

The *Evening News*—probably one of the largest consumers of petrol in the London district—is still screaming about the shortage of fuel. If anything, this is worse than urging people to economise in one column of the paper, and publishing in juxtaposition a number of enticing advertisements of attractive hotels and hydros. To reach them people must use the train, yet the same papers have the effrontery to urge people to keep off the railways. It can be said without exaggeration that a certain section of the press is gaining distinction in this war!

Recovery of Stolen Harley-Davidson.

The report of a stolen Harley-Davidson combination in *The Motor Cycle* was solely responsible for its recovery at Northampton on the 22nd inst. The machine, owned by T. J. Ross, captain of the Woolwich club, was stolen from a garage at High Road, Lee, a fortnight ago. On Tuesday, May 22nd, two men on a H.-D. stopped for petrol at a Northampton garage, but, not having a licence, were refused. When they offered the machine for sale, the suspicions of the garage manager were aroused, and, on the pretence that he would consult his partner, he 'phoned the police, who took charge of the machine and riders. The two men, who gave an address at Camberwell, S.E., were charged and remanded on the following Thursday. The garage manager stated that he read in *The Motor Cycle* that a corresponding machine had been stolen. Detective-Sergeant Flipp, of the Lee (S.E.) Division, subsequently drove the machine from Northampton to London, and it was identified by the owner. It had evidently had hard usage.

The National War Funds.

At the week-end the principal relief funds stood as follow:

National Relief Fund (distributed £3,608,015)	£6,119,194.	0	0
Red Cross	6,611,802	0	0
Tobacco Fund	130,120	0	0

Air-cooling.

The makers of the Morgan Runabout state, in the correspondence columns of this issue, that by no means does their confidence waver in the efficiency of air-cooling for the runabout type of machine.

Two-stroke versus Four.

The subject discussed by "The Critics" this week is one on which almost every practical rider holds his individual views, but possibly the discussion reported will open up new lines of thought to quite a few of those interested.

"Roundabout" Cars.

We have often drawn attention to the use of five-seated cars by a single officer, and the unnecessary waste of petrol caused thereby. During a discussion in the House on the use of motor cars by officers, Mr. Houston was reported as suggesting that "Officers should be supplied with little '*roundabout*' cars instead of big high-power cars." [The italics are ours.—ED.] Obviously, "runabout" is intended, and we commend Mr. Houston for his desire to see the Government practise what they preach in the matter of economy. We might go further, and ask what is the matter with a motor bicycle, and a sidecar as well if two seats are required.

Fleet Street Traffic.

In its issue of May 23rd our contemporary *Motor Traction* gave its annual table of Fleet Street traffic. The census, which is taken from the windows of the Press Restaurant, extends over a period of twelve hours—from 8 a.m. to 8 p.m., and has been a feature of *Motor Traction* since 1907. This year 47 motor cycles passed, as compared with 20 last year, 40 in 1915, and 19 in 1914; and of the total traffic this year 49.35% was mechanically propelled, as compared with 51.36% last year. One would have anticipated an even heavier drop than this, considering the reduced motor omnibus service, by which the old horse 'bus is coming into its own. In 1907 only 10.96% of the traffic was mechanically propelled.

Overseas Competition.

We would particularly draw the attention of our readers to the table of Aus-Australian motor cycle imports given at the end of the Overseas Correspondence in this week's issue. No more startling proof could be given of the significant fact that British trade Overseas is very seriously threatened, and that our hold upon foreign markets, even in our own highly patriotic colonies, is seriously weakened by American progress and American keen business administration. For many months past we have attempted to keep the seriousness of the situation before our readers, and now that the value of American machines imported into Australia in one year exceeds the value of British machines imported by over £52,000, manufacturers and others will perhaps realise that our repeated warnings were not without foundation.

THE REPAYMENT OF LICENCE DUTY.

Half the Local Taxation Licence to be Refunded for Unused Vehicles.

MANY of our readers are aware that there was a clause in the Finance Bill to the effect that

> "Where the holder of any licences to keep a motor car granted for the year nineteen hundred and seventeen has at any time, before July 1st, surrendered the licence in such manner and to such person or authority as may have been prescribed by regulations made by the Treasury, for the purpose of being cancelled, he shall be entitled to repayment of one-half of the duty paid on the licence."

The Motor Cycle, it will be recalled, urged such a course when petrol supplies were stopped. At the time of writing the Finance Bill has now passed its second reading, but the time of the third reading has not yet been announced. There seems to be little doubt that the clause in question will be duly passed, but there is considerable speculation as to the manner in which the refund referred to will be obtained. Doubtless we shall receive information in due course, but, as the licence has to be surrendered by the end of June, there is not very much time; consequently we communicated with the Secretary of the Board of Customs and Excise. The reply, however, conveyed no further information than is given in this paragraph.

DECISION IN IMPORTANT CASE.

Is a Boy under Seventeen Years of Age Authorised to Drive a Sidecar?

AT Blackburn, on May 23rd, the magistrates gave their decision in the case heard five weeks ago, in which a boy under 17 years of age was proceeded against for driving a motor cycle and sidecar.

It will be recalled that the contention of the police was that a motor cycle with sidecar attached was a car within the meaning of the Act, and that, therefore, the boy had no right to drive it—even though he possessed a motor car licence.

A fine of 10s. was imposed, and the Chairman said that for the purpose of that case the motor cycle and sidecar was a car within the meaning of the Act.

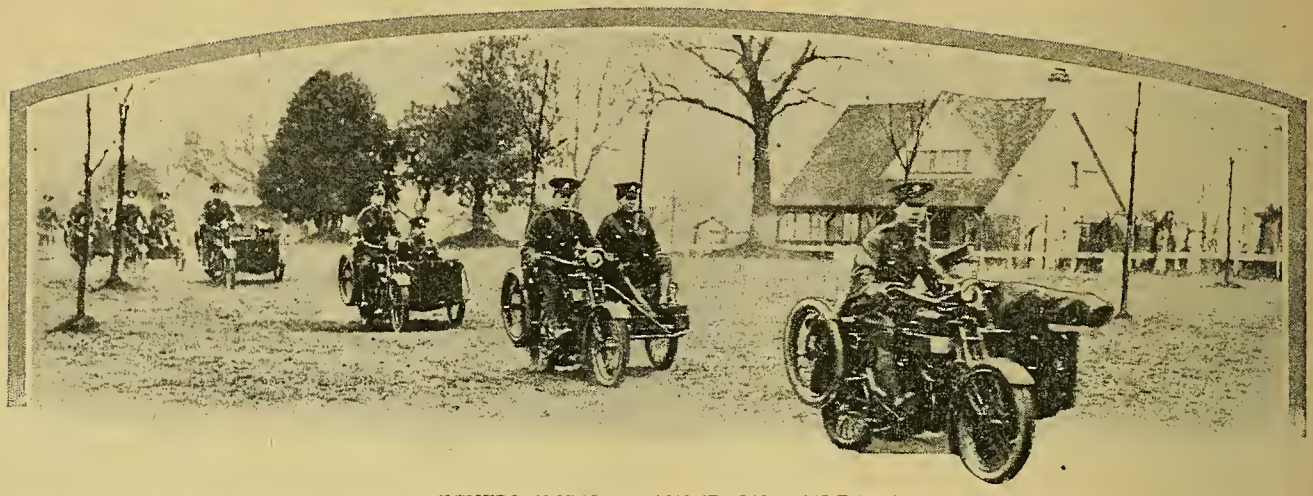
The counsel for the defence said that neither he nor the boy's father agreed with it. If the appeal were taken to court on the points raised by the Bench the real point would be obscured. As the Automobile Association and the Auto Cycle Union were anxious that the points should be decided by, if necessary, the Divisional Court, they had decided to have the licence put in order, assuming it was wrong, and then invite a further prosecution.

The presiding magistrate said the Bench agreed that the matter was an important one, and the counsel for the defence observed that it was unfortunate that in just the case in which a test might have been made there was a mistake in the licence.

With Motor Cyclists Behind Europe's Trenches.

An Interview with Capt. Louis Keene, M.M.G.S., British Army, who has spent Two Years at the Front in France with Motor Cycle Machine Gun Batteries.

By J. H. DONEHUE, in "Motor Cycle Illustrated," U.S.A.



VICKERS-CLYNO MACHINE GUN SIDECARS.
The foremost machine carries the gun (which is obscured by its covering), the next sidecar is the ammunition carrier, and the third is a spare gun carrier.

ALONG a Flanders road, shell-pitted, furrowed, sodden under a chilling drizzle of rain, there chugged cautiously at dusk of a certain memorable day two motor cycle machine gun combinations, a pair of motor cycle caissons, and four solo mounts, all carrying lean-limbed men in khaki—young Britishers going out to the inferno behind the firing lines on a special mission.

For half an hour, their ears assaulted ever more ominously by the thunder of the guns, they rode forward, hugging the scant shelter of the roadside; now and then skirting the edges of cavernous shell craters, slipping, slithering, jolting, but keeping unfailingly the pace of their captain.

Machine Gun Unit in Action.

A lane turned off at the right towards the ruins of a farmhouse. The riders swung in on it. Beyond the crumpled walls of the house stood the remains of a barn. In this the motor cycles were sheltered. A word from the tall young captain and the machine guns were whipped from the sidecar chassis. Ammunition carriers busied themselves; then another brief command and the party moved forward again, this time afoot.

Only the captain knew where he was going—and he was not over sure. A superior officer had simply called him in, placed a pencil point on a military map, and said, "Here is your job; and there is your shelter. It's dirty work, but important. Do it to-night." And the young captain, being worthy of his rank, had nodded affirmatively, saluted and retired, keen for action, but still wondering how he was expected to locate the points "here" and "there" on the ground itself.

The motor cycles were left a mile, perhaps a little more, behind the British front lines. Further progress, with the guns and other equipment, was necessarily slow and nerve-wearing. Two hours passed before the captain was satisfied that he had located his destination. On the map it was —— Farm, but only an angle of stone wall remained to identify it. In that angle the party took its stand and set up the machine guns.

Dawn showed the motor cycle fighters what they had come for. On a slight rise of ground in the distance was a German outpost, cleverly arranged, and harbouring deadly snipers and equally deadly machine guns. Fire from that point swept an important bit of interesting road. British Headquarters had decided that it must be stopped, and the motor cycle section was out to stop it.

There is no space for details of the fight. It continued for hours. The Germans brought up additional machine guns, and the angle of stone wall sheltering the Britishers stopped hot lead by the pound. But the young British captain had surprised and out-manœuvred his opponents; his position gave him command of the situation, and in due time the Germans were blown out of their little stronghold. Later in the day an attempt was made to reoccupy the outpost, but to no avail.

New Light on Two-wheeler Usefulness.

At nightfall the British riders, with only one slight wound among them all, returned to their motor cycles, snapped their guns in place, swung into the saddles and followed their captain back to headquarters.

Thus passed one actual incident in the career of a motor cycle machine gun section behind the British lines in France; and when the officer who directed it, Captain Louis Keene, O.C. Motor Machine Guns, R.F.A., told the story in detail to the writer a few days ago he took pains to show that it was quite an ordinary episode after all. It is given prominence here because it throws new light on the part that is being played by the motor cycle in the world war, and because it shows strikingly the degree to which motor cycle co-operation with the other army branches has been carried by the men who are making history with their machines along the battlefronts in Europe.

Captain Keene, who is now in the United States on special detail, brings the most comprehensive and valuable fund of information that has so far reached this country concerning motor cycles at the Front. He spent two years behind and in the trenches in France, and during most of that time was in charge of a motor cycle machine gun battery. He has had the best possible opportunities to study every branch of the motor cycle service, and the value of his observations, in view of the entry of the United States into the war, cannot be gauged too highly.

Giving the Bare Facts.

"You will be interested in learning that the motor cycle has not only fulfilled but exceeded all the expectations of its friends," said Captain Keene, "and that one of the accepted lessons of the world war concerns the absolute necessity of motor cycle units, for machine gun service as well as despatch work. During the very early days of the conflict the motor cycle was looked upon as somewhat of an experiment, in connection with actual fighting, at least, but it is now as much a fixture as the machine gun itself.

"The fact that Great Britain has about 70,000 motor cyclists enlisted, and most of them on active service, gives

With Motor Cyclists Behind Europe's Trenches.—

an impressive answer to the people in the United States who are still wondering if all the fuss about the military motor cycle is justified. Add to that the knowledge that nearly a million motor cycles have been disposed of—worn out or smashed—by the British armies since the opening of the war, and you see at once that the power two-wheeler must be a vital adjunct to twentieth century warfare. There is no need to argue the point; no army in the European conflict to-day would attempt to continue without its motor cycles—that's all."

"In which field have motor cycles rendered the more important service—with machine guns, or in despatch service?" Captain Keene was asked.

"With the machine guns, I believe," came the reply. "The full story of what motor cycle machine gun units have been able to do for the British armies will never be known to the public, but it is an understood fact that they have figured prominently at moments of desperate tension, and that the riders have never yet been found wanting.

Importance of Machine Gun Units.

"I do not for a moment wish to belittle the great service of the despatch riders, for there are heroes among them by the score, but I cannot avoid the conclusion that in the final analysis it is the motor cycle machine gun unit that weighs heaviest in the scales for victory. We consider one machine gun equal in fighting strength to 100 men, and when it is possible to move such a weapon quickly from point to point by means of the motor cycle, you will understand that the combination is a wonderfully strong one.

"At this point," said the Captain with a smile, "it may be well to blow up one of the ideas that seem to have taken hold of your American motor cycle advocates—it is this: We never count upon operating a machine gun from the sidecar chassis. It has been done from time to time, of course, but only under extraordinary conditions. If a motor cycle machine gun section runs around a corner and comes in contact with a patrol of German Uhlans, for example, the British gunner will certainly fire from the sidecar platform, because he has no chance to do anything else. But all our calculations are based upon the removal of the gun from the platform for fighting.

"I may have obtained an incorrect impression of your motor cycle machine gun plans in the United States, but I have been led to believe that the boys expect to do most of their fighting with the gun on the chassis. That is wrong. In the first place, both gun and gunner would be too high. They would afford an excellent mark for the enemy, because they could hardly find suitable shelter. Secondly, the motor cycle is seldom, if ever, taken directly into a machine gun action. It is left in the rear, a mile or more, and the motor cyclists carry their guns and other impedimenta forward as best they can. Then when another section comes up to relieve them, the lads carry their equipment back to the machines again.

"It is a generally recognised rule that the motor cyclists are not to approach within 1,500 yards of the firing line, and there are various good reasons for this arrangement. Consider, first, that every foot of space on the roads immediately behind the trenches is valuable—for motor lorries, ambulances, and all the vitally important rolling stock of a big army at death grips—and remember also that no lights are carried by any vehicles within ten or fifteen miles of the trenches, and that a motor cyclist venturing with his machine into the crowded area directly behind the lines at night would be simply flirting with sudden death. The motor cycle machine gun units are never far behind the lines, except when resting in billets, but they seldom get inside the 1,500 yard limit.

Transport Train Hazards.

"It is probably true that more motor cyclists have been killed so far by the motor lorries of their own armies than by enemy bullets. The transport trains have orders to get through at top speed, regardless of other road users—and they follow those orders. If they run through a motor cycle squad and smash them right and left it is all in the day's work—and the motor cyclists know it. If a huge motor truck would simply bump a cyclist off the road and let it go at that, the case would not be so bad; but it usually hurls the rider fifteen or twenty feet ahead on the road and then runs over him.

"Under no conditions can a motor lorry train stop without orders. Tons of high explosives, or equally precious foodstuffs, must go through at any cost once they are started."

"In the light of your actual experience, what is the biggest lesson we have to learn in this country concerning the motor cycle in military service?" asked the writer.

"That motor cycle service in war is not a circus, or a carnival, or a dress parade for the delectation of the assembled multitude," came the sharp reply. "It is a business, and a bloody business at that, and you have failed to grasp that idea.

"Isn't it true that the motor cycle was looked upon almost entirely as a despatch-carrying vehicle at the opening of the war?" was another question.

"It was for a time," answered Captain Keene. "The despatch rider works between Brigade Headquarters and certain official points behind the fighting line. Now and then a shell dropped behind the lines will get one or two of our motor cycle lads, but as a rule their chief danger comes from the motor lorry train that sweeps down on them without warning from around a turn. Quite a few of them are smashed up also by riding into shell holes.

"Great Britain is using about 40,000 despatch riders in all; the remaining 25,000 or 30,000 motor cyclists are in machine gun batteries, signal corps, and convoy service.

In reply to a question, "From which walks of life do you recruit the greatest number of British Army motor cyclists?" Captain Keene stated that most of the riders appeared to come from the indoor working class, and that thousands of clerks were on the lists.

"Some of the best British blood has gone over to France with the motor cycle units," the officer continued. "The thinking man who has been confined to an office most of his life does not relish the idea of going into the trenches. He craves action, and if he does not feel equal to trying for the flying corps his next thought usually is for the motor cycle service. Our motor cyclists are, as a rule, young men of education and good family, but no lines are drawn, naturally. Thousands of former day labourers are riding motor cycles with our armies on the Continent and making good at it.

Six Months of Hard Training.

"Every British army motor cyclist receives six months of careful training before he goes to France. It is not enough for him to know how to ride a motor cycle; he must be drilled in all that goes to make a soldier. You will have to adopt the same arrangement in the United States.

"Your immediate needs in this country, so far as military motor cycles are concerned, can be summed up as follow:

"You must realise that the motor cyclist in war has no fun, that he is a businesslike hardworking chap, operating under iron discipline; that he does no speeding on his machine, or very little of it; that he is a soldier in the fullest sense of the term, not merely a sportsman; that he is not exempt from trench digging or any of the other menial jobs of an army; that he cannot step from the street to the army—he must be trained and then assigned for duty in such units as can be utilised efficiently for the work in hand.

"One thing is certain. Your American army is going to need motor cyclists—it must have them—and judging by the experiences of the British armies in France you should lay your plans for at least 10,000 riders. When the first 10,000 are ready for service you should go right on training others."

GATHERING OF MOTOR VOLUNTEERS.

Meeting at Blackpool, Sunday next. Orders for the Day.

WITH reference to the meeting of Motor Volunteers at Blackpool on Sunday next, June 3rd, to which we have already referred, the following is the programme of events:

2.0 p.m. All sections parade at "Arras Trenches" Field, Lytham Road, South Shore, Blackpool.

2.30 p.m. Ride past on Blackpool promenade, with saluting point.

3.15 p.m. Demonstration by squad of Liverpool H.C.B. M.C. section of signals and movements, and also showing method adopted when convoying column of vehicles, etc.

4.0 p.m. At the conclusion of the above demonstration (indicated by the squad returning to their base) all section commanders will march their men back to their machines, lining them up for inspection.

4.30 p.m. Col. Smith will address the men.

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

AIR-COOLED RUNABOUTS.

Sir,—There seems to be some misunderstanding with regard to the air-cooled Morgan; we have not the slightest intention of abandoning the air-cooled model. We have ourselves great faith in air-cooling, and we are assured that it is preferred by very many.

It is certainly true that our latest model (it can hardly be called a post-bellum model, for it is already in being) has a water-cooled engine. But this by no means supersedes the air-cooled models, which are now fitted with all the improvements included in our latest water-cooled pattern. At the present time we are too busy with munition work to devote much time to experiment and design. After the war we shall continue our endeavours to perfect both the air-cooled and water-cooled types.

For MORGAN MOTOR CO., LTD.,
F. S. H. MORGAN, Director.

A NOVEL SPARKING PLUG.

Sir,—In your issue of May 17th you illustrate a plug under the above title. We are afraid its claim for novelty is somewhat out of date, as it was patented in this country in 1903, but, for reasons which will perhaps be obvious upon close inspection, it has never found a very wide market on this side; also, with regard to the insulator, it should be mentioned that this is not *quartz* but glass, which is softened by heat and melted into position. There is no weld or other chemical combination between the insulator and the electrodes.

THE SPHINX MANUFACTURING CO.
W.A.C.

[We have pleasure in publishing the above letter as requested, but the Hendee Manufacturing Co., on being consulted, tell us that the Anderson plug appears to be the only plug, of English, or French, or American make, which gives good satisfaction in the high-powered Indian racing machines, particularly the eight-valve pattern. The plug is novel, inasmuch as it has apparently never been seen by motor cyclists in this country previous to its use on the Indian demonstration machines. The insulation may not be quartz, but it is a substitute which will stand much more heat than glass, and in America is known as "Quartz Insulation." The plug gives no trouble, and shows no evidence of leakage.—ED.]

BALL BEARING CONNECTING RODS.

Sir,—In your issue dated May 24th I notice "J.C.B.'s" letter under the above heading.

Let me assure "J.C.B." that ball bearing connecting rods are *not* common on aero engines. As a matter of fact, they are quite the exception, as they are not trustworthy on reciprocating parts.

"J.C.B." mentions, and asks for experiences of, the ball bearing big end of the Gnome engine, but he and others must not lose sight of the fact that this engine is not of the reciprocating type. It is one thing to swing a part round a given point, and quite another to jerk it about in space, as is done with the piston in a reciprocating engine. It should be borne in mind that the ball bearing is only suitable for use on connecting rods of "rotary" or radial engines. In these engines the cylinders radiate from a common centre, and the numerous big ends can be mounted by means of wrist pins to a common big end, which in turn can be mounted on two large ball bearings.

As a matter of fact, the Gnome engine as now used (of 80 and 100 h.p.) has two piston rings to each piston—one of a special design and of brass, and the other of cast iron of the usual pattern used in petrol engines. The use of one piston ring, as in the 50 and 70 h.p. size of cylinder, did not give satisfaction, and has long fallen out of use. Correspondents will do well to remember the essential differences between the rotary or rotating cylinder, the radial, and the reciprocating types of aero engines.

Reading. TECHNICAL SGT.-MAJ. R.F.C.

OUGHT FIRMS TO MAKE THE COMPLETE MACHINE?

Sir,—Mr. J. H. Lester, in his letter of May 17th, touches upon the above subject. He suggests that each unit of a motor cycle should be made by a separate firm. If the idea of this is to produce large quantities of reliable machines, it is good; but at present the chief object of most firms is to improve.

If there is a separate firm for the engine, magneto, carburetter, gear box, frame, tank, saddle, wheels, and tyres, each firm will be restricted in improvement by what the other firms do in regard to the other parts, and they would have to be certain of an enormous sale. This might cause excessive standardisation, which tends to prevent improvement.

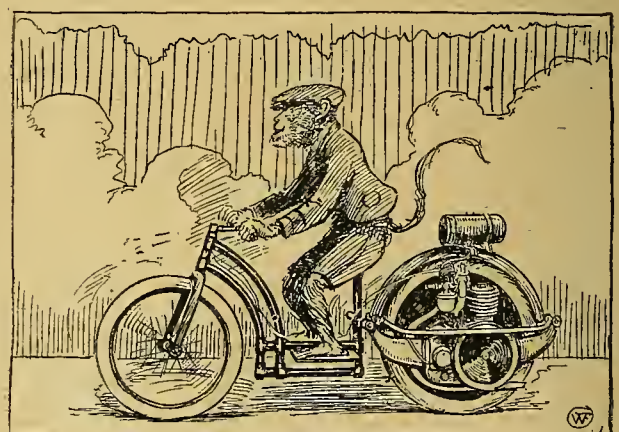
If there were two or three firms making each of the units, the assemblers would have a choice in the parts they used, which would result in a mixture (some machines are bad enough already).

I know that magnetos, carburetters, saddles, and tyres are usually made by different firms, but that is enough for one type of machine.

I heard of a case where a person sold a good machine of a well-known make because it had a certain type of gear box. He will not buy a certain other make, because it incorporates the same type of gear box.

Therefore, to obtain improvement, each firm must make as much for itself as possible. R.E.C.

Camberley.



A MONKEY "KNUT."

One of the "turns" on the American music hall stage is a motor cycling monkey. A special machine has been constructed for it, having an Auto-wheel as the power unit. On a miniature motor-drome the little animal drives the cycle at "full speed"—whatever that may mean. The design of the machine closely follows the Elleham, a Danish design.

PETROL WASTE.

Sir,—Recently a despatch rider stopped outside my premises. I noticed that his B.S.A. carburetter was leaking, and when I drew his attention to the same he remarked, "Oh, that does not matter, it is cheap enough." I said, "Yes, but we poor devils cannot get it." He then said, "We get too much of it." The carburetter was leaking ninety-two drops per minute. If you think well you are quite welcome to publish this letter with my name and address. F. P. CHAPMAN.

PETROL PERMITS AND SUPPLIES.

Sir,—In reference to your paragraph in "Current Chat," "A May Day Forecast," it is true that the Petrol Control Committee renewed some licences, including my own for six months at two gallons a month, and for which I paid the tax, 6s.; but it is impossible to get any petrol, although I have the permit, so the renewal of licences, so far at any rate, is a farce in my district. Possibly the Petrol Control Committee will allow the dealers to supply those who hold permits, when they see their way clear to do so, as I presume that when the Petrol Control Committee granted us our renewals they fully intended to keep their word.

Camborne. 8 H.P. ENFIELD.

POLICE TRAPS NEAR LONDON.

Sir,—I see by a recent issue of *The Motor Cycle* that the north and north-west of London have been favoured with police trapping, and, in addition to the traps mentioned, I myself saw one as I was coming home from the Midlands on Sunday, May 13th, at about 6.30 p.m. I had just come down the hill at High Barnet, and was preparing to go up into Whetstone at about my usual speed, when I saw a policeman look back at two more confederates, one of whom pulled a watch out of his pocket (at least I judged it to be), so I slowed up to about 10 or 15 m.p.h. I must say if this is the way police traps are worked, one must be asleep to be caught, as the thing was so clumsily done. As you comment, these men surely could be more honourably and worthily employed, seeing how the country needs men.

E. HAYES.

ERRATIC RUNNING OF 4¼ H.P. ENGINE.

Sir,—Although for many years I have been a constant reader of your progressive and interesting paper, up to the present I have hesitated to communicate with you and your readers on the various topics which appear in your pages.

On my return on sick leave from Gallipoli, in June, 1915, I purchased a new 4¼ h.p. combination of well-known make, and up to the month of February last it gave satisfaction. About the date mentioned, however, a peculiar and utterly baffling irregularity manifested itself in the running of the engine. When descending a hill, especially a steep one, the engine beats became more feeble and misfiring set in, resulting invariably in total stoppage. Nor could the engine be restarted again, unless copious injections were made, even though the tank were filled with pure petrol. The odd part of the thing was that this never occurred on the level, and the machine climbed hills excellently, and started well from cold. In order to trace the fault I had the magneto and connections taken down and tested at a first class firm here, and it was reported to be sound, as I could quite believe. It always gave a first-class spark. The carburetter was also thoroughly examined on two occasions by competent mechanics, quite apart from my own investigations; and in order to make doubly sure another magneto and carburetter were tried, but the fault remained. In order to leave no detail untried, four different plugs, all sound, were tried, and a new high-tension wire. The engine was taken down, and timing checked—all found to be in order. A feature of the machine's running was the absence of overheating. Everything which suggested itself to me and to my friends has been done to trace the fault, but with no effect. The machine has been in the hands of three different firms in Town, but they can make nothing of it. I am consequently writing in the hope that your readers may be able to suggest some diagnosis which would reveal the defect. Perhaps some of your numerous readers have been similarly troubled. I may say that on each occasion the tank has been practically full, or rather well filled, when the stoppage occurred, and it was not caused by the petrol flowing towards the front of the machine, and away from the petrol pipe at the rear of tank. Nor is the stoppage which occurs due to an air lock. Up to the present it remains unsolved.

In all my experience of motor cycling—which extends over seven years—a similar experience has not occurred, although I have ridden machines in such wild parts as the Province of Ping-Ko—Northern China—Afghanistan, and Bolivia. A. N. NIAS,

Belfast. Capt. 5th Punjabs.

[Any suggestions which readers can make will be forwarded to our correspondent, who is leaving for service abroad early next week.—ED.]

SPARKING PLUG DESIGN.

Sir,—"The Critics" and their remarks on plugs are mainly responsible for this letter.

Most people are agreed that the Bosch plug, of hated origin, was one of the best ever made. Personally I have had best service from the four-point plug of this make. The type to which I refer had a plain open-ended body with no projections of any sort. The central electrode was thick and was split into four. These four sections were then bent outwards radially, so as to leave a proper gap between their ends and the plug body.

I always found in practice that sparks had crossed all four gaps if these were set with reasonable care. Presumably the spark finds its own easy spot to start with. The heat of the spark discharge then causes this point to rise in temperature and consequently in resistance. The current then tries the next easiest point till the same thing happens there. It then moves on to the next point, and so on till it comes back to the first point, which has had time to cool down. The action of the plug in this way prevents "bridging" of the points, which is a common failing of single-point plugs if set close enough for slow running and easy starting. Again, the points never do attain the same heat as a single point for obvious reasons.

I may point out that there is no similarity between this type of four-point plug and those which have only one central electrode and four thin wires stuck into the plug body and made to project towards the centre, as this type suffers from the same defects as the single-point. Now, sir, I think it is up to the plug makers to give us the Bosch type of four-point plug. It only needs a new pattern of central electrode to do this, I fancy, as I have no complaint to make of the insulation on some of our best plugs. Perhaps you can give them the hint, for I know of many who are waiting for this type to return.

Birmingham H.B.

OVERHEAD VALVES.

Sir,—The topic discussed by "The Critics" recently greatly interested me, as I have been using overhead valve flat twins for over three years, under all kinds of conditions, including competition work, freak hill-climbing, fast touring, etc., both solo and sidecar.

For solo work I have found overhead valves most satisfactory, giving the engine speed, acceleration, and cool running not obtainable with side-by-side valves, the acceleration being particularly fine, but I am not so satisfied with overhead valves for sidecar work; here you get the engine working under an entirely different set of conditions, generally a sidecar machine engine is running under a much greater load per horse-power, and at a lower engine speed; this is where the overhead valve engine is not so happy—it gets harsh and loses its flexibility.

Perhaps you will say, "Why not have a four-speed gear box and keep the r.p.m. up and more constant?" I daresay that would be quite satisfactory, but the average motor cyclist has a kind of prejudice about changing down to a lower gear. Get amongst a crowd of cyclists yarning and hear some of their top gear stories. I have heard some! I must say I prefer something a little more dogged than an overhead valve engine for sidecar work. I confess a little weakness as regards changing down myself; it is very nice to able to "tick over" on top. Give me overhead valve, for solo work and side-by-side for sidecar work.

There is considerable room for improvement in the overhead gear as generally used at present. Besides the general wear of the overhead rockers, etc., there is the wear on the valve stems and guides, caused by the circular motion of the rocker on the valve stem when in operation.

This wear is much aggravated by the lack of lubrication, from which these parts suffer. I have never yet had the pleasure of seeing an engine with provision made for the lubrication of the valve guide. Certainly, I have seen some engines with their guides well oiled, but that has been caused by gross over-oiling of the engine and poor crank case compression releases.

When the overhead gear has been improved I think we shall see a more general use of the overhead valve engine, but I do not think it will entirely displace the side-by-side arrangement. Each has its own sphere in which it can reign supreme.

The danger of valves breaking on the overhead system on a properly designed engine is hardly worth considering, as the engine works at a lower temperature than a side-by-side engine.

There has been much discussion lately regarding the hot side on overhead valve flat twins. It was contended that it was much more pronounced on the overhead valve system than on the exhaust over inlet system; under all the conditions on which I have used my machines—and that has been far more strenuous than the average—the effect of the hot side—supposing one exists—has never been apparent at any time. That is with an engine with cast iron cylinders—if it affects an engine with steel cylinders, then I think it must be the cylinders themselves at fault.

I look forward to the return of competition work—who does not?—when the competition between the flat twins will be really interesting. Many of them will be making *début* to competitions—and I hope to be well in it.

K. V. CHIDLEY.

"SOME" BICYCLE.

Sir,—I read with great interest the letter of "J.B.T." of Coventry in your issue of May 17th. As regards his assertion of it being both an absurd and impossible task to climb Sunrising on a single-geared two-stroke, I claim to say that the machines that he and his friends have ridden were in very bad tune or overgeared. I can furnish proof of my statement that the hill in question was climbed after a twenty mile run on a 1914 Baby Levis (standard 2¼ h.p.) geared 6 to 1. My brother, who rode this machine daily on business as a traveller, rode straight to the top, came down again to the first road on the right, turned round and ascended again—his machine, or rather his engine, not showing the slightest sign of konking out even on the second journey up. I think that if "J.B.T." has much experience of real hills he would call Sunrising a mound after such hills as Porlock, Lynmouth, Beggar's Roost, and numerous others of North Devon. I think that any ordinary machine should climb the hill named under ordinary conditions, but I have found from my own experience of North Devon that even a two-speed is insufficient for a machine under 3½ h.p. I have ridden motor cycles since the early days of the front drive Werner, so, like "J.B.T.," claim to have a little experience. I put forward the usual disclaimer. S. A. REEVE, L.-Cpl.

TWO-STROKE V. FOUR-STROKE.

Sir,—I have read so much of late of the wonders of two-strokes that I cannot refrain any longer from writing a few words in praise of the baby four-stroke.

Last summer I purchased a 2½ h.p. two-speed New Imperial J.A.P., which I ran for about 1,400 miles without trouble, bar puncture and belt breakages. This wonderful little engine has taken me up practically every hill on top gear, including that very steep hill, West Street, Harrow, and the one leading out of Edgware towards St. Albans—I think, Brockley Hill. I have done 35 m.p.h. with a passenger on the carrier, not all out. Regarding fuel, the engine will run on ordinary house paraffin with any kind of vaporiser. It has done seventy miles on four and a half pints, and this included a good bit of low gear work in London.

Although the engine runs well on paraffin, it heats quickly, and does not give off much power. Petrofin I have used, and the engine runs extremely well on it. There is not such a marked difference between that and petrol. Of course, I cannot start on these substitutes, petrol having to be employed when the engine is cold.

A few weeks back I purchased a Wicker Watsonian featherweight sidecar, which I fitted, and which runs most satisfactorily. I went to Eastbourne and back (130 miles) from London, with a passenger in the sidecar, and, by frequent manipulation of the magneto lever, I took practically all the hills on top gear. The route I took was from Marble Arch, through Victoria, Vauxhall, Streatham, Croydon, East Grinstead, Uckfield, Hailsham, and Eastbourne. The Uckfield hills leading out of the town I was unable to take on top, but quite easily on low. The machine has touched 30 m.p.h. with the sidecar occupied, and could have done more if needed, but I do not believe at any time in driving all out.

To conclude, I think the four-stroke lightweight combination is ideal for economical travelling. I have used only petrol since attaching sidecar, and have not yet attempted paraffin or substitutes. I do not possess a kick-starter or clutch, but the engine is quite easy to start. I have many times paddled off with sidecar when the engine was warm. I prefer driving a sidecar machine empty to driving a solo machine when by myself, because over these awful roads the sidecar keeps the machine down.

I think the four-stroke lightweight engine—*i.e.*, the J.A.P.—can hold its own any day against a two-stroke as regards economy, reserve of power, reliability, and easy starting. Last, but not least, how I wish that spring frames were universal! Usual disclaimer. RELIABILITY.

Marble Arch, W.

Sir,—Perhaps you will allow me, as an old motor cyclist, to say a few words on the subject of two-stroke motor cycles. Comparisons are odious, but useful. I have owned and ridden about twenty various makes of motor cycles since about 1898, and can therefore claim to have some experience.

It was in 1912 when I first rode a motor bicycle that could be compared to a small two-stroke. This was a 2½ h.p. New Hudson-Jap, with Armstrong three-speed hub gear, which was designed and made originally for this model. I weigh nearly thirteen stone, and this little machine would take me through the hilly parts of North Wales, over such roads as the direct mountain road from Lake Vyrnwy Hotel to Bala, with a luggage case weighing about 20 lb. Its only fault was a small belt, ¾in., and a small engine pulley, which meant much slipping in wet weather. At ordinary touring speeds it would keep up with 3½ h.p. single-geared machines, and beat them on a difficult hilly road, but it was, of course, comparatively slow when "scrapping" commenced. I estimate its truthful average speed on tour at 22 m.p.h. Motor cyclists who tour at over 22 m.p.h. miss a lot of pleasant sights but *chacun à son goût*.

Now for the two-stroke. I have ridden a Baby Triumph, and find it a delightful little machine in many respects. It is spoilt, in my opinion, by wheels which are too small; 26in. should be the minimum, and I prefer 28in. Twenty-four-inch wheels should be tried over a pot-holey road in the dark, without a lamp, to appreciate thoroughly how well a radius of twelve inches fits the average pot-hole.

Starting is easy, but no easier than the 2½ h.p. four-stroke three-speeder, which could be paddled off on bottom gear.

The consumption of spirit in the four-stroke was 110 miles per gallon, under the most favourable circumstances, viz., dry roads, no head wind, and long runs in fairly level country. In Wales the consumption was about 100 m.p.g. On good, fairly level roads the Baby consumes spirit at the rate of approximately 60 m.p.g. The weight of the two machines is about the same.

As an experienced rider, I fail to see that the pros of the two-stroke outweigh the cons, when comparing it with a four-stroke of practically equal capacity.

In cheapness of actual production it may be a few shillings less, but not sufficient to count when the retail figure is in the neighbourhood of £45. The 2½ h.p. 1912 four-stroke cost £52 10s. 0d. The 1916 2½ h.p. two-stroke cost, in pre-war days, £42.

Where the two-stroke is likely to score, when spirit once more becomes plentiful, is in the direction of a very cheap machine of light weight, intended not to exceed a maximum speed of, say, twenty-five miles an hour. Such a machine could be made light, and could have small tyres and wheels. To buy very cheap machines and then expect the same results as with more powerful and expensive mounts is, however, courting disappointment.

"Zeno's" letter in the issue of May 17th—and he is evidently an enthusiastic two-stroke exponent—tells us practically all we want to know, viz., that the two-stroke consumption is over 50% more, and the speed the same.

Birmingham L.C.

OVERSEAS SECTION.

A Commentary based upon Practical Experience and a Study of Overseas Opinions.

IN this month's issues of *The Motor Cycle* we have described and illustrated four new models from leading British factories, namely, Sunbeam, Rudge, Brough, and Royal Ruby. Of these, the Sunbeam and the Royal Ruby have been specially designed to meet the requirements of the Russian Army on the field, and, as we have already pointed out, the Russian specification covers many points of design which are particularly attractive to the Overseas rider. The long list of special military machines we have dealt with of late must now be drawing near its completion, but there is no doubt that the chief points of the Russian specification—increased ground clearance, larger wheels, etc.—will have a permanent effect upon British design.

♔ ♔ ♔

Hubs and Hub Protection.

IN our issue of May 3rd we illustrated a type of wheel bearing which should prove specially suited to Overseas requirements. In place of the ordinary balls, large rollers, with very ample bearing surfaces, were employed, and a hub of this kind should, of course, possess exceptional wearing qualities and require less adjustment than the ordinary ball bearing type. It does not, however, diminish the necessity for a dust-excluding hub, for a roller bearing is just as susceptible to the detrimental effects of grit as is a ball bearing, but given proper protection the roller type should prove vastly superior for rough country use to any other hub at present on the market. A dust and waterproof hub is not, of course, beyond the possibilities of design; however, it is not among the daily store of this world's goods, with the result that in regions of mud, dust, and watersplashes the hubs of a motor cycle often wear quickly and require constant watching. If properly lubricated, however, the most inefficient hub should wear well, and the tip is to pack the hub with grease under pressure, say, once a week during the wet season—not merely filling the hub, but allowing the grease to continue squelching between the cones till the fresh, clean, lubricant makes its appearance. The old and dirty grease which first oozes out of the cones contains the destructive matter, and should be entirely removed.

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Flat Twin Engines Overseas.

THOUGH the highly efficient flat twin engine will undoubtedly obtain a very high degree of popularity on the British highways, or where similar conditions prevail, it is rather doubtful whether this type of engine will compare favourably with the steady pulling low compression type for pioneer lands, where stiff collar work is the common order. Though delightful to ride when circumstances permit one taking advantage of its "revving" capabilities, the ultra-efficient flat twin is, as a general rule, by no means so tractable as an engine designed for hard pulling at low speeds, and its exceedingly rapid acceleration is apt to land one in difficulties when the road surfaces are of the patchy order. On good roads an engine that will "rev" (as T.T. men style it) is a pleasure to handle, but on bad roads its disadvantages are sampled without the full realisation of its peculiar advantages. Where pioneer conditions prevail, therefore, it can be taken that the most popular type of mount among ordinary tourists will remain as hitherto—the low compression low speed type. By this we do not mean to infer that the ultra-efficient flat twin engine is unsuitable for Overseas requirements; such a statement would be misleading, since a very large number of these machines are rendering excellent service amidst pioneer conditions, even though they may not be particularly suited to the work imposed upon them.

♔ ♔ ♔

Lubrication of Ultra-Efficient Engines.

SPEAKING of this type of engine we were recently testing a new design flat twin, the crank case of which is arranged to carry one quart of oil at normal level. This design is particularly worthy of note, because it leaves a very wide margin for forgetfulness on the part of the rider. It proved almost impossible to dry the engine up, however hard it was driven, while the quantity of oil contained in the crank case had the effect of cooling the engine internally—an important point when high speeds are to be maintained or long mountainous ascents undertaken. With the crank case at normal level the machine could be run fully out in perfect safety for twelve miles or more without a single drop of oil passing through the sight feed.

♔ ♔ ♔

Lubrication and the Two-stroke.

NO type of engine presents the same difficulties as regards the important matter of lubrication as the two-stroke. Petroil is all right in theory, but it is extremely wasteful on account of the amount of useful lubricant blown out of the exhaust ports with every explosion, while it is admittedly a messy way of going about it. Drip feed to the induction pipe is cleaner, but this, too, is wasteful and somewhat erratic. Crank case suction with the oil reservoir integral with the crank case is among the best when properly designed,

Overseas Section.—

and is surprisingly economical; but in the two-stroke engine a small quantity of lubricant, at any rate, should be fed from above the piston. The obvious reason for this is that there is always pressure above the piston in this type of engine, with the result that, if the oil be fed to some extent from above, it is carried down to its proper place, whereas if it be fed entirely by splash from below the high explosion pressures are constantly tending to drive the oil downwards from the top ring, which consequently is apt to run dry and become burned into its groove. Thus, with the petroil system, the top ring obtains a certain amount of lubricant from the wet piston head, and does not gum in its groove so readily as when the piston is fed exclusively from below. The gumming up of the top ring is one of the chief drawbacks of the two-stroke (which is becoming more and more popular Overseas), and that it is purely a matter of inefficient cooling is proved by the fact that water-cooled two-stroke engines —motor boat and Scott type—do not gum up their rings anything like so readily.

OVERSEAS CONDITIONS AND THEIR EFFECT UPON DESIGN.

It is clearly shown that the reiterated appeals from our Overseas readers for high ground clearance, waterproof magnetos, and positive transmission are not made without reason. This South African scene on the Umholoti River is a typical one. The difficulties motor cyclists have to contend with can well be imagined, especially if caught on the wrong side of the river during a "freshet." All the sidecars shown crossing the ford are Premiers.

A Selection of Letters from Readers scattered all over the World.

Overseas Riders Home on Leave.

Sir,—The appended letter, sent us from a reader of your paper in Nigeria, may be interesting to other readers in that and other British Dominions. We would explain that our scheme is that clients should deposit the value of the machine wanted with us, and that we undertake to repurchase it at a definite fixed depreciation within six months of purchase.

For the benefit of our client and others, we would like to say that we intend to keep this scheme in operation after the war, but shall arrange that, instead of the depreciation being fixed, it be graduated, according to the price paid, so that a two-stroke at £20, for example, shall not suffer the same depreciation as an 8 h.p. combination at £60.

RIDER TROWARD AND CO.

78, High Street, Hampstead, N.W.3.

"Gentlemen,—I was much interested in your repurchase scheme, advertised in *The Motor Cycle* of February 22nd, and have for a long time felt that just such a proposition would be taken up readily by the large number of military and civil officers, doctors, mining engineers and accountants, bank clerks, and white employees of the large trading firms out here, who, on account of the climate of the West Coast of Africa, are sent to England on three or four months leave at the end of every year or eighteen months.

"They are all potential motorists, and many are actually so, but when a man is home only for three months, he does not necessarily wish to buy the latest model new, nor is he inclined to waste the first fortnight looking round the country for a suitable machine, and at the end of his leave at least another fortnight trying to dispose of his mount. Again, he may reach England at the end of December or in January, and not feel inclined to do any motoring in the very cold weather, but as soon as March or April arrives, he would be very glad to pick up a suitable machine for the two months, knowing exactly what he will get for it when the time arrives for him to return to West Africa, and be able to use it up to the last day.

"I speak from some experience of selling mounts at the last minute to save garage rents while away, and I know that the majority of men cannot bring their machines back with them, because they are resident in parts of the country where any wheeled traffic is out of the question.

"There is lucrative business in such a scheme as yours when it is properly known, because every man returning to England on leave has sufficient ready money to indulge in a motor cycle at least, while, on the other hand, the sum you refund him on return of the machine would be very useful for the necessary purchase of new kit to take back with him.

"I therefore hope that your scheme is not just a temporary war measure, and that sufficient support will enable you to offer first class mounts in the same way after the war is over.—D.M.S."

An Australian Storm.

MRS. T. E. CUNNINGHAM, Croydon, Sydney:

"Having noticed in *The Motor Cycle* some time ago a 'competition' for miraculous escapes from being seriously hurt while motor cycling, may I add my experience to the number of escapes? During the Christmas holidays we

Overseas Section.—

decided to go on an extensive tour through the country, having friends to join us with their motor cycle and sidecar —our combination being the latest electrically-equipped Excelsior, and theirs an N.S.U. Everything went well the first day out; we did 136 miles comfortably, going through some magnificent country, and following up the Blue Mountain range for over 100 miles—climbing to the top of a huge mountain one minute, and almost the next second dropping swiftly down into the valley. Among the mountains there was the beautiful Australian bush on either side for miles, and in the valley and on the level stretches nothing but wheat and hay for miles and miles. Reaching Bathurst the first day we stayed overnight, and then next day took a short trip to Orange, a distance of about 36 miles. But we were not destined to go any further, for just as we reached Orange one of the greatest storms on record commenced. So far we had found beautiful roads all the way, but after the storm roads were washed away, tree-trunks and fences strewn along the track, and railway lines uprooted! Six people were drowned, sheep lay dead in hundreds, and wheat and hay were washed away and damaged to the extent of some thousands of pounds. This is what we saw the first thing on Christmas morning, so we decided to push back to Sydney. On our way we found an Indian motor cycle and sidecar, which had attempted to cross a bridge during the storm; the bridge gave way, the combination was smashed, and the driver and passenger taken to hospital. Next was a motor car abandoned at the side of the road; then another further along, with the occupants sleeping inside under the cover all night. That day we had our usual one o'clock Christmas dinner at a little farmhouse at half-past four o'clock, where they gave us bread and butter and jam, and some tea, instead of plum pudding and turkey.

"Next day we left for home, and were doing splendidly until within about fifty miles of Sydney, when a nut came off the front axle of the N.S.U., causing the machine and sidecar to turn a complete somersault, pinning the lady passenger with a little girl down underneath it and throwing the driver clear. But, by some good fortune, the whole thing turned another somersault, righting itself and leaving the lady and little girl on the ground uninjured.

"This, of course, ended the tour, and the lady declared she would sell the German machine at once. But since then she has gone on a 3,000 mile round trip between Sydney and Adelaide (South Australia), *viâ* Melbourne (Victoria), so we are looking forward to news when they return.

"The same gentleman, Mr. Bailey, during the recent coal strike, had a James motor cycle installed and drove a Royal printing machine very successfully two shifts a day, and was only cleaned out at the end of a week. The James agents fitted it and were very pleased with the result."

An Old Machine in Penang.

"C.A.G.B.," Penang, F.M.S., writes: "I have a 1911 fixed engine 3½ h.p. Triumph to which I fixed a sidecar—Dugal chassis and a wicker body—with also a pillion seat, locally made to order by a Chinaman, and fixed on the carrier with rattan strips by him. Now, sir, do not laugh or groan, and say poor machine or engine. Though I was laughed at and ridiculed when I had the above sidecar and pillion seat fixed on to my Triumph, which, by the way, had been thrown aside as useless, it pulls the sidecar with my wife and daughter inside and my son on the pillion seat over the roads and some slight gradients in Penang. My weight is over 140 lb., wife nearly 156 lb., and son and daughter weigh roughly about 140 lb. I have to push and run with that load. I have geared machine 5 to 1. If my bicycle does not fire in four paces I get someone to help, though this happens very seldom. The Triumph engine is, in my humble opinion, *nulli secundus*. In climbing hills, I would say that I always gradually open out the throttle and close off the air till a level or downward slope is reached, when I do the reverse. Another tip: I always lift the exhaust gradually in turning corners up hills, drop it, and accelerate immediately. I have been exceptionally lucky.

"I have now got possession of a 4½ h.p. 1914 fixed engine Triumph, which I have fixed into the frame of my 1911 model, as also a Philipson automatic pulley.

"I shall bring my machine and sidecar home on my next leave and have a try at the hills, etc., on pleasure. I refused an offer of $375 for my turnout. A dollar is worth 2s. 4d. I was not over politely told that I was a bally ——. I wish you every success, and trust to get your paper regularly."

An Impression of the Far West.

A British Columbia rider, contented with his lot, writes from the Kootenays: "In this country most of the trails —those in any way possible—follow the lakes and rivers, and for real rough riding they would be hard to beat. For a time all goes well, then suddenly one comes across a patch of swamp, caused by a stream draining through the muskeg across the road, and here trimmed tree trunks, varying from two to eight inches in thickness, are laid upon the liquid surface to prevent vehicles sinking permanently into the slime. If there has been much rain the logs are floating, and when one steps upon them the black slush squirts a foot high, filling one's boots and saturating one's breeches. At other points the trail does what can best be described as the 'disappearing trick'—that is, it drops twenty yards or more, almost sheer, over a rocky dome, and vehicles passing up or down seem to be standing straight on end.

"We have not many motor cycles out here in the Rockies, but quite a few Ford cars, which come in very useful for fishing and hunting. A heavy motor cycle is a very tiring thing to ride. The type of machine I would fancy out here would be a lightweight—say 2¾ h.p., flat twin, all chain (open) drive, hand-controlled plate clutch which will not burn out, and three-speed gear giving ratios of 7, 10, and 18 to 1. One must have a machine which will climb absolutely anything, and slowly. Yet it should be light, or you are absolutely done if you get stuck in the mud or happen to run off the trail. I once got bogged with a big Indian not far out of Vancouver, and was pretty well exhausted ere I got it out. It is because motor cycles—or rather the heavy type most plentiful out here—are so exhausting to ride on bad roads that most of the boys prefer to put their dollars on the Ford, which is really a marvel of efficiency. The treatment some of them get in this country passes all belief, but since the outbreak of war most of us are sticking out for all British goods.

"The scenery in this country is wonderful. I have travelled pretty extensively, but I have never found anything to beat the Kootenays—Arrowhead Lake and the Slocan Valley being beyond comparison. We have experienced a pretty dreary winter—one day the sun would be shining brilliantly, bluebirds flying about, partridges shouting in the thickets, and the next—a blinding blizzard! So it went on.

"Well I must close, but I would like to say for the benefit of the boys in the trenches who do not intend remaining in England after the war, and who want to find a glorious country with sport of the best on every side, good pay, and British companionship, that B.C. offers these things with an open hand."

British Machines in Portugal.

"G.B.," Rua da Lucta, Lisbon: "We always say that the best motor cycles are the English, and there is no doubt about that. I have tried some makes of motor cycles, and the best ones I found here were one Clyno and one F.N. 1914 model. Of British machines we have only two makes out here—the Clyno and the Sun. The others are all American—Harley-Davidson, Indian, Pope, Henderson, and Excelsior."

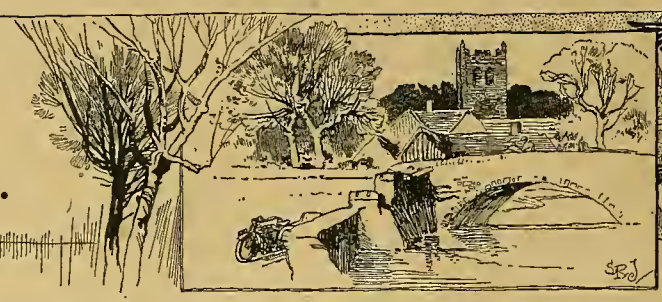
AUSTRALIAN IMPORTS OF MOTOR CYCLES.

THE table below gives at a glance the value of motor cycles imported into the States of Australia, together with their country of origin, during the year 1916:

MOTOR CYCLES.

Country of Origin.	N.S.W.	Victoria.	Queensland.	South Australia	West Aust.	Tasmania.	Comm'nwealth.
	£	£	£	£	£	£	£
U. Kingdom ..	28,717	18,769	4,380	7,063	6,958	2,470	68,357
Canada	—	442	—	—	—	—	442
France.....	—	7	—	—	—	—	7
U.S.A.	33,069	44,734	11,199	21,681	2,983	7,305	120,971
Totals	61,786	63,952	15,579	28,744	9,941	9,775	189,777

MOTOR CYCLIST VOLUNTEERS.



Orders for Volunteer Motor Cyclists, as Adopted by the Lancashire Motor Volunteers, Port of Liverpool Centre, Heavy Car Battalion.

Devised by O.C. Motor Cyclists' Section, S. W. PHILLPOTT.

THE Motor Cyclists' Section is at all times under the orders of the motor cycle officer, or an assistant motor cycle officer, excepting when individual men are detailed as despatch riders to officers, in which case they take their orders for the time being from such officers.

Twenty motor cyclists are required for each of the four squadrons of the battalion as follows:

1 motor cyclist sergeant,
1 motor cyclist corporal,
18 motor cyclists,

and it is the duty of the M.C. N.C.O.'s to do their best to keep their squad up to strength, and to instruct them as to their duties. When the M.C. section is at full strength two M.C. N.C.O.'s will be appointed (ranks, sergeant-major and quartermaster-sergeant). Men should do all possible to persuade other motor cyclists, who are likely to attain proficiency and take an interest in their work, to join the section. The duties of motor cyclists are as follow:

1. Despatch riding.
2. Outpost and guide.
3. Scout and patrol.
4. Signalling.

Necessary Qualifications.

All men of the M.C. section are expected to qualify in elementary infantry drill and rifle shooting, and, in addition to the above, they should acquire a knowledge of the following matters, for which purpose classes will be formed, at which instruction will be given indoors, with practice movements on alternate Sundays, as per the weekly orders appearing in the Friday issues of the *Liverpool Daily Post* and the *Liverpool Courier*:

1. Map reading and map making.
2. Signalling.
3. Taking and recording observations.
4. Repairing, and improvising roadside repairs to machines.
5. The use of the compass and astronomical observation.

Infantry drill will be given as a separate section, except when a battalion parade is ordered. When the M.C. section is on parade with the battalion and cars two M.C.'s act as D.R.'s and will be attached to advance and rear officers; the remainder will act as advance guards. The duties of advance guards are as follows:

1. Advise police on point duty of the approach of the column.
2. Act as police at dangerous corners or places while the column is passing, and indicate the direct route.
3. Arrange for billets or feeding for the column.
4. Arrange for and select suitable standing room for the cars of the column.

The advance guard will be under the orders of a M.C. officer or N.C.O., who will detail men for various duties, on completion of which they should proceed to rejoin the advance guard.

Signals of Command.

On assembly anywhere (whether as the M.C. section or as a portion of the battalion or squadron), M.C.'s must line their machines, taking their dressing from the right-hand machine at an interval of two feet from the tips of the handle-bar next to them. When the motor cyclist section is on parade the following signals will apply:

One long whistle—Fall in at ease, single file, front of machines (sidecar passenger at side of driver).

Two long whistles—Come to "Attention," "About turn," start engine, and place machine on the ground (off stand).

Two long and one short whistles—Drivers (where possible) and sidecar passengers take seats.

Three long whistles—Move off in column, from right or left as O.C. leads.

When moving in column, positions must be maintained, passing is not permitted, and single column formation kept unless instructed "double column." Proper distances (to be maintained) from the rider in front are as follow:

At 12 m.p.h.	12 yds.
At 20 m.p.h.	20 yds.
At 25 m.p.h. or over ...	25 yds.

These distances may be altered at the discretion of the O.C.—according to circumstances. Ride in line, not spread all over the road, keeping to the left side of the road as far as possible. In the event of any man falling out, he should do so at the left side of the road, and proceed with the repairs if possible.

When in column the officer in command leads, the second in command brings up the rear, both being accompanied by solo riders to act as despatch riders.

When moving in column, signals are to be passed on from man to man down the column:

1. Slow up.—Right arm extended and moved slowly up and down.
2. Halt (in column formation).—Right arm extended upright.
3. Change of direction to right.—Right arm straight out.
4. Change of direction to left.—Left arm straight out.
5. Place of assembly.—Right or left arm extended with fore part (from elbow) straight up. (At place of assembly, stop engines, form up in line to right or left of leader as indicated by right or left arm giving signal. If in single column form single file, if double column form double file. Care should be taken to pull up in exact dressing. Place machines on stands, and stand to attention in front of machine.)
6. Form double column.—Right arm extended horizontally with circular movement. In forming double column, solo men ride up to sidecars ahead, on the right of same.
7. Form single column.—Left arm horizontally extended with circular movement. In reforming single column, solo riders slow up to position.
8. Dismiss.—Short whistle, with circular hand signal overhead.
9. Advance (if stopped at the "halt"), or close up to distances (if moving).—Right arm extended, slightly dropped, waving forward.

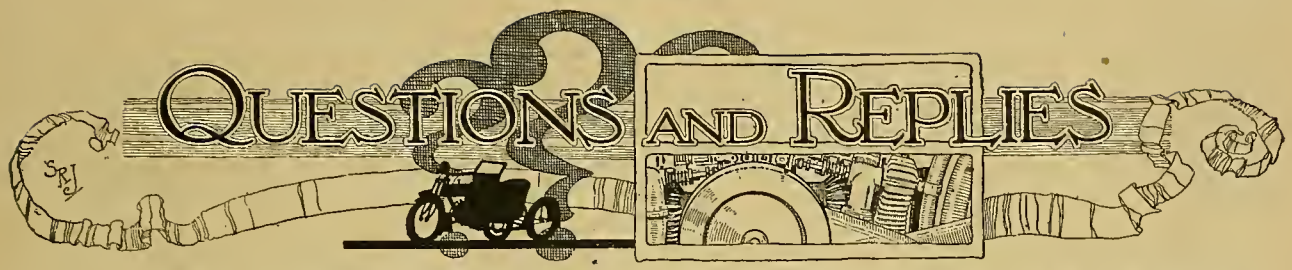
Detail.

Saluting.—Salute in infantry fashion when standing or walking. When riding, salute by sharp turn of the head towards the officer. Men being addressed by an officer stand to attention, salute moving away, also on reporting later, and when moving away following report.

Discipline.—Any communication for an officer must be made through a N.C.O., who will accompany the M.C. to the officer for the purpose (except delivery of despatches).

Uniform.—M.C.'s must parade in uniform—*i.e.*, cap (with badge), tunic, breeches, belt, brown leather leggings (without straps), and boots.

In submitting to the Editor articles, photographs, or drawings, contributors are asked to mention whether the illustrations are exclusive, and further to enclose a stamped addressed envelope for return of unaccepted contributions.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Road Taxation.

I am a sweep, running between town and country. I have my name on both sides of the tank, but the police are in doubt whether or not I ought to take out a licence. Will you please inform me?—J.H.C.

If your machine is in use simply and solely for the carrying of goods or equipment you are exempt from the Inland Revenue tax, but you may have some difficulty in proving that a solo mount can be used for the transport of equipment. If you had a sidecar attached, bearing your name and address, it would be quite a different matter. A vehicle for which exemption from the tax is claimed must not be used otherwise than commercially on any single occasion.

Suction Drip Feed.

I desire to ask your advice concerning the lubrication of my 1916 5-6 h.p. twin. I purchased the machine after it had run 200 miles, and it goes well except for the oiling. There is a drip feed lubricator on the front end of the tank and a screw stud immediately to the right of it. When the engine is running in free and I work the stud I can get a gradually increasing feed as I unscrew. When I am running on the road, however, after two turns the rate of flow drops down to, say, fifteen drops to the minute and will not increase. I am using good oil. I should like to know—(1.) The probable reason of the oil going only at a certain rate and not increasing above the fifteen drops. (2.) How many drops should I give at, say, 15-20 and 25 m.p.h.? (3.) Should it be necessary to use the hand pump in conjunction with the drip feed?—T.W.

(1.) This type of lubricator is dependent upon suction from the crank case, and therefore the rate of flow is governed to some extent by the speed of the engine. Make sure that there is no leakage round the glass bulb, as this would tend to release the vacuum. If you cannot get a sufficient flow after thorough examination of the system you might try the effect of a lighter grade of oil. (2.) At 15 to 20 m.p.h. fifteen drops a minute is about right, but at 25 m.p.h. and over the quantity should be increased, and when driving, say, at 30-35 m.p.h. the oil should run almost in a continuous stream. Much depends upon wind resistance and the individual engine. (3.) The drip should suffice for ordinary running, the pump being used to give an extra charge on hills, etc.

Timing a Two-stroke.

I have a 2¾ h.p. two-stroke and cannot get the timing correct. I have set it as follows: Piston dead on top, ignition lever fully retarded, contact points just about to break. Is not this right?—E.A.G.

No, the timing is too far retarded. With the piston about $\frac{3}{32}$in. from top, the points should be just breaking with ignition fully retarded. Some two-strokes will take even faster timing than this.

Taking Down a 2¾ h.p. Douglas.

Please tell me how (1) to remove the cylinders from my 1916 2¾ h.p. Douglas without first removing the whole power unit from the frame, and how to set about it. (2.) How can I get at the bottom hexagon nuts fastening the cylinders down? (3.) How can I remove the flywheel? I have tried several times, but so far without success. (4.) The carburetter is a Douglas-Binks three-jet. About how many miles ought I to do to the gallon on fairly level roads, with the engine in trim? (5.) When the engine is cold and a start is attempted only one cylinder—the front one—will fire, but after a few minutes running both cylinders work regularly. The plugs are three-point Sphiux, with waterproof terminal caps. I may say that I only experience this starting trouble when the engine is cold. When both cylinders get working it is a very smooth running machine.—H.E.P.

(1.) The whole power unit must be removed from the frame. Full instructions are given in the Douglas handbook. You have first to see that the petrol and oil pipes and control wires are disconnected. Then it is merely a question of undoing the chain and the various nuts and bolts. The whole may then be stood on the bench or fixed in a big vice, and you can work in comfort. (2.) When once the engine is out all nuts are reasonably accessible. (3.) To remove the flywheel, undo the locknut, jam wedges between the flywheel and the crank case, and sharply tap the end of the shaft with a mallet. The process can be made even simpler by the use of a wheel drawer. (4.) About eighty miles to the gallon. (5.) There may be an air leak at the induction pipe union to the front cylinder, or the defect may simply be due to condensation in the long induction pipe. Try binding the pipe with ordinary milliner's tape, wrapped over with black insulation tape.

Timing an Engine.

Will you please tell me the correct valve timing for a 3½ h.p. (85 × 88 mm.) single cylinder?—A.K.

Depends on the cam design. Inlet opens $\frac{3}{32}$in. down suction stroke; inlet closes $\frac{1}{4}$in. up compression stroke; exhaust opens $\frac{1}{2}$in. from bottom of firing stroke; exhaust closes $\frac{1}{16}$in. down suction stroke.

Carburetter Flooding.

I have just fitted a new Senspray carburetter on my machine, a 4 h.p. Bradbury, and when I turn on the petrol the carburetter seems to flood, so that I have to keep turning the petrol off Could you give me some advice as to the cause of this waste? I have cleaned the carburetter out, and have fitted a 40 jet. What No. jet should I use?—E.J.

A No. 40 jet should be about right. The flooding is probably due to the needle valve requiring grinding in. Grind it in lightly with a little crocus powder, taking care to keep the needle perfectly upright.

Scott Lubrication.

Will you kindly give me some advice as regards the oiling system of my 1915 Scott motor cycle? It is fitted with a semi-automatic sight drip feed. The cylinders always seem to be fed unequally, and when once one of the cylinders begins to fail through want of oil it simply gets worse and worse until I am obliged to inject oil into the crank case by hand, which is very tedious. I have to do this over and over again, and, consequently, the running of the engine is rendered very uneven. Is there any remedy for this, or does the trouble lie in the fact that it is a bad system of oiling?—E.F.L.

In the side of the crank case which is getting starved of oil the packing ring is probably not bedding properly in the cup, and this allows the gas to be blown up the oil tube on the downward stroke of the piston. When the suction occurs this gas has first to be sucked into the crank case before the oil is allowed to enter. The remedy, of course, is to make the packing ring bed properly. If the other side of the crank case is getting too much oil an improvement may often be made by closing up the brass nipple in the tube leading into the crank case directly underneath the brass union. The closing up process should be continued until the levels in the wells are approximately equal.

Lubricating a Two-stroke.

My 2¼ h.p. mechanically lubricated two-stroke is subject to fits of four-stroking and uneven running. For two or three days it will run perfectly, then, for no apparent reason, it begins to misfire. If I leave it alone it automatically cures itself, and I have not been able to locate the cause of the trouble. Do you think the defect will be due to sticking or looseness in the carburetter or magneto? Your advice would be much appreciated.—G.B.

The trouble is undoubtedly due to irregular oiling. An overdose of lubricant will entirely upset the running of a two-stroke, and it often takes some little time to work out. The viscosity of the oil used, and also the temperature of the atmosphere, will determine the rate of feed. In warm weather a very fine setting of the needle is required, and it is best to stick to one brand of oil.

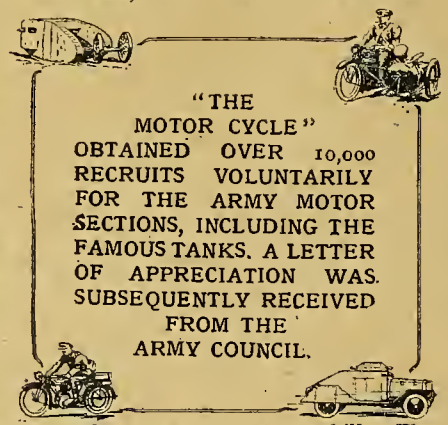
Sudden Pulling Up.

My mount is a 4 h.p. 1916 single, with countershaft gear, and for the last 400 miles that I have driven it (I have only been 1,100 miles altogether) I have experienced a fault, which is either "binding" in some part of the machine or bad carburation. If the machine is run with about half throttle and full air for three minutes or so, it then gradually pulls up and would stop dead unless either the gear is changed down or the air is shut back and kept almost entirely closed. It will then continue to run all right, and in a short time the gear may be rechanged up or the air again opened. I generally employ the air lever in order to recover. If it is binding, I cannot discover the reason or whereabouts, and the gear box seems to be cool after pulling up, and the same thing happens even if I have just oiled all the bearings. The engine gets plenty of oil. I am wondering if it could be an air leak. But I am pulled up so quickly and with such a "dragging" sensation that I am led to believe that there must be binding somewhere.—G.H.F.

There are one or two things which may account for the state of affairs you describe. (*a.*) Partial seizure of the piston or a bearing. As you say the gear box bearings run cool, the defect would be in the engine. To find out whether seizure and stiffness are the cause raise exhaust valve immediately symptoms are felt, and note whether machine runs on freely or is drawn up hastily by the transmission. (*b.*) More probably it is a fault in the carburation. Your engine is getting too much air from some quarter. Go over the induction pipes carefully by running engine on stand, and dripping oil on induction joints—leakage being shown, of course, by disappearance of the oil. If leak is found, run seccotine into joints, or bind with insulation tape. (*c.*) Pre-ignition caused by overheating of sparking plug points. Try the effect of an air-cooled aero engine plug. (*d.*) Petrol not reaching carburetter freely owing to air lock, lack of ventilation to the tank, or some impediment in the feed pipe or carburetter.

Under-lubrication and Weak Compression.

I should be grateful to receive your valued advice with regard to my 1914 3 h.p. twin-cylinder. On Friday last I went to Sheffield (about forty miles), making a non-stop run. During the last few miles the machine lacked its customary power, and I noticed that the carburetter emitted a stream of white vapour, even with air lever well advanced and throttle nearly closed. Before leaving Sheffield I took off the float chamber of carburetter, and cleaned it out; I found this brimful of petrol. I thoroughly wrapped unions of inlet pipe with new insulation tape, cleaned plugs and magneto contact breaker. (Last two operations were, I think, unnecessary, for ignition appeared all right.) I also raised all four adjustable tappets so that they would just revolve freely with valves on seatings. On my return journey I found great difficulty in starting up, same lack of power and vapour from carburetter air intake. However, I made a non-stop to within sixteen miles of home, when the machine refused


"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

to take a not very severe hill. The engine was terribly hot, and I observed that the oil had been leaking from the glass tube "tank," which is fitted to this machine under the saddle. This receptacle was empty (lubrication is operated by screw-down valve and circulating pumps). The bicycle would not start again, although when I pushed on low gear and dropped the exhaust it fired weakly—absolutely no power whatever. Further, a thick volume of smoke came from the carburetter. I obtained some paraffin, and injecting it got the engine to revolve much easier, but it would not start. I left the machine at a farmhouse!—H.C.

On the occasion when you stopped, the engine was undoubtedly short of oil, and before riding again you had better see that there is sufficient oil in the crank case. You do not say whether or not the compression is good, but it sounds very much as though one or both of your exhaust valves are badly burnt, and that all your valves require attention. Escape from the inlet valve or weak inlet valve springs would cause blow back through the carburetter. We would advise you thoroughly to examine the valves first, fitting new springs if necessary, while the exhaust valves may require truing up in a lathe. Make sure that your petrol level has not altered. If the level is too high it would cause overheating and the symptoms you describe. See that the needle valve is seating properly.

Purchasing Magnets.

Would you please supply me with the address of some firm manufacturing steel magnets or supplying the suitable steel?—A.M.

Each magneto or dynamo manufacturer specifies that his magnets be made from certain compounds of metals, and, given this specification, any Sheffield firm could undertake the production of the magnets. The difficulty lies, then, not so much in getting the magnets made as in obtaining the specification of the necessary materials.

Methylated Spirit as Fuel.

My machine is an 8 h.p. M.A.G.-Sunbeam, and will run on half and half without any heating whatever, and run well, too. I had thought of adding methylated spirit to paraffin and trying how it would go on it. I shall be glad to have your opinion.—S.E.E.

Methylated spirit is merely alcohol denatured, and therefore should give moderately good results in an internal combustion engine. It requires more vaporising than petrol, and gives a less powerful explosion, but by adding methylated spirit to paraffin the properties of the latter as a substitute should be improved. It is very unwise to run on heavy fuels without some additional heating. The engine may appear to pull well, but a hot air intake costs little, improves consumption, and may save the engine from very rapid deterioration.

RECOMMENDED ROUTES.

CARLISLE TO HUDDERSFIELD.—H.T.B.

Carlisle, Penrith, Kendal, Kirkby Lonsdale, Ingleton, Settle, Skipton, Keighley, Halifax, Huddersfield.

GOSPORT TO PAINSWICK.—H.C.H.

Gosport, Titchfield, Southampton, Ower, Landford, Salisbury, Beckington, Stapleford, Maddington, Chippenham, Malmesbury, Tetbury, Minchinhampton, Stroud, Painswick.

MORECAMBE TO CARDIGAN.—J.W.L.

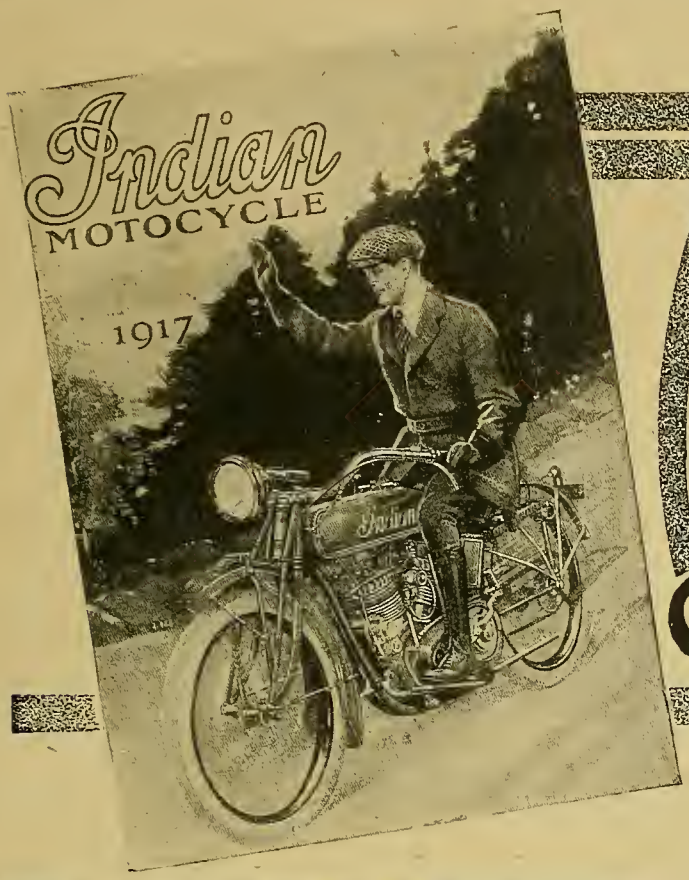
Morecambe, Lancaster, Garstang, Preston, Ormskirk, Liverpool, Birkenhead, Chester, Wrexham, Chirk, Oswestry, Welshpool, Newtown, Llanidloes, Llangurig, Dyffryn Castell, Aberystwyth, Aberayron, Cardigan. Approximately 270 miles.

WORTHING TO MALVERN.—J.S.P.

Worthing, Broadwater, Washington, Pulborough, Petworth, Trotton, Petersfield, Bramdean, Winchester, Andover, Ludgershall, Burbage, Marlborough, Swindon, Cricklade, Cirencester, Cheltenham, Tewkesbury, Upton, Malvern. Approximately 150 miles.

BIRMINGHAM TO FROME.—E.B.

Birmingham, King's Heath, Studley, Alcester, Evesham, Cheltenham, Painswick, Stroud, Nailsworth, Bath, Beckington, Frome.



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CANADIAN WORKS—
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Indian

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All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

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For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

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Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

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Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

3½h.p. Abingdon King Dick, 2-speed, clutch, handle starter, with lightweight sidecar, outfit fully equipped, and in excellent condition; special bargain, 25 gns.; exchanges.—Newnham, 223, Hammersmith Rd., W.6. 'Phone: 80. [3168

A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305

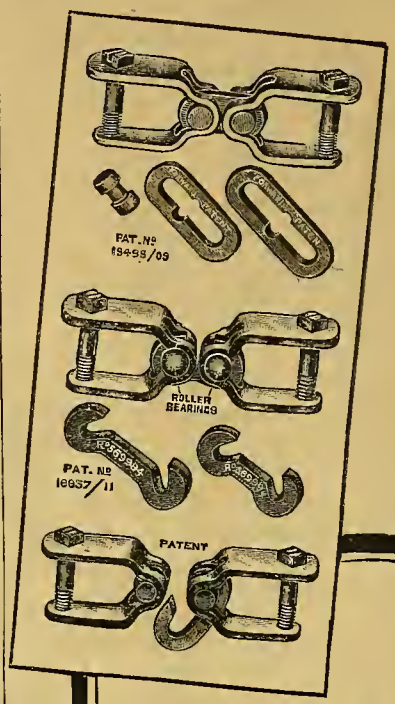
RIDER TROWARD'S, 78, High St., Hampstead. —1914 A.J.S., 6h.p., 3-speed; 42 gns. [3244

A.J.S. Lightweight Motor Cycle, 2½h.p., 2-speed, in splendid condition throughout; accept £25.—Embro Motor Co., Charlotte St., Hull. [319?

2¾h.p. A.J.S., actual winner of the Tourist Trophy 1914, in perfect condition throughout; £45.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0492

A.J.S., 1915, 3-speed, clutch, T.T. bars, P. and H. head lamps, generator, rear lamp, tools, sound tyres, machine perfect throughout; £43/10.—Advertiser 156, Gt. Portland St., W.1. [285?

A.J.S. Combination, 6h.p., with magnificent family sidecar (disappearing child's seat), hood and screen, luggage carrier, Pillion seat, combined acetylene and electric lamps, speedometer, 2 horns, watch, pump, and tools, in very good order and condition; extended payments arranged; £72.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [3148



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Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S., 6h.p., late 1914, 3-speed, tyres only done 50 miles, Cowey speedometer, 8 gn. model Lucas horn, tools, 2 retreaded tyres not used; price 55 gns.; excellent condition.—Bailey, Maidens Green, Winkfield, Bracknell, Berks. [3143

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [0796

1916 Allon, 2¾h.p., 2-speed, 1,500 miles; £35.—Cavell, 43, Caledonian Place, Clifton. (D) [X0620

ALLDAYS Allon.—All models are in stock at Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [3239

ALLDAYS Allon, 2-stroke, 2-speed clutch; £35; practically new, done about 200 miles.—Blackham, Stroud, Kenilworth. [X0713

ALLON, brand new single and 2 speeds in stock.—Paskell's, 121, High Rd., Kilburn, N.W.6, and 143 Stoke Newington Rd. N.16. [2989

ALLDAYS and Onions Allon 2-stroke, 2¾h.p., in excellent condition, little used, the property of an officer.—Pulman, 243, Willesden Lane, London, N.W.2. [3144

ALLDAYS Allon, single and 2-speed models in stock for immediate delivery; extended payments arranged.—Harrods, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [3149

ALLDAYS Allon Lightweight, 3h.p., 2-speed, 1917, two weeks old, not done 50 miles, perfect condition; cost £44, what offers?—Box L3,741, c/o *The Motor Cycle.* [3271

1916 Alldays Allon, 2¾h.p., 2-stroke, 2-speed, clutch model, lamps, horn, generator, etc., everything in splendid condition; bargain, £35.—Box L3,746, c/o *The Motor Cycle.* [3275

£32.—1916½ (August) 2¾h.p. Alldays Allon, 2-stroke, 2-speed, F.E., fast, mileage 600, lamps, horn, tools, etc.; cost £44, as new.—45, Manchester Rd., Lostock Gralam, Northwich, Cheshire. [3131

Ariel.

ARIEL, 3½h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [2562

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

ARIEL 1917 Model, 3½h.p., actually here; also 1914 3½h.p., 3-speed, and sidecar, £44/2.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [3235

ARIEL, 1913, 3½h.p., T.T., Bosch, B.B., Cowey, Miller lamps, new piston, gudgeon pin, rings, valves, absolutely sound; £21.—Watling, Portswood, Leopold Rd., Felixstowe. (D) [X0766

Bradbury.

BRADBURY, 3h.p., early pattern modernised; must sell; £5, offers.—Basevi, Malmesbury. [X0797

RIDER TROWARD'S, 78, High St., Hampstead. —Bradbury, 1913, 3-speed, clutch, 23 gns.; Bradbury, 1913, 2-speed, clutch, 22 gns. [3256

B.S.A.

B.S.A. New 1917 Models H and K actually in stock. —Moss, Wem. [2388

COLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A., 1914, 3½h.p., lamps, etc., fine condition; £25, or offer.—Red Deer Garage, South Croydon. [3206

B.S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888

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NEW ZEALAND—Gordon & Gotch, Ltd., Wellington, Auckland, Christchurch, and Dunedin INDIA—A. H. Wheeler & Co., Bombay, Allahabad, and Calcutta.
SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

Twin Engines.

FLAT twin engines loom large in the post-war plans of many motor cycle manufacturers, and, while we welcome them gladly and are satisfied that a large number of our readers will do the same, it should not be supposed that we have by any means seen the last of our old friend the V twin. There is no doubt that the flat twin is a sound proposition both from the theoretical and practical point of view. Herein it may claim advantages over the V twin, which is more in the nature of a compromise, for it is a twin designed to take the place of a single, and so designed that it may be built into a motor cycle frame such as had been used in the past for a single. This fact set a limit within which the designer was compelled to work, but it must be conceded that he has carried out this part of his task admirably, for the V twin fits into a standard frame excellently, provided that the angle between the cylinders does not exceed 60°.

Let us refer briefly to the main advantages of the two types. The flat twin is practically perfect in mechanical balance, or at least it can be made so, though it has a slight couple as generally built (to overcome this a double connecting rod to one of the pistons is necessary—an added complication which can quite well be omitted, for the cylinders need be very little out of line in any case). The equal firing intervals (360°) give an even torque with one impulse for every revolution. In these two points the flat twin has an undoubted advantage, for the balance of the V twin, with the exception of the 90° engine, does not attain to anything like the excellence of the flat twin, in spite of the fact that a couple is absent. V twins are commonly built with cylinders at an angle of 45°, 50°, or thereabouts, and some are 60°. Now, in the matter of balance, the engine improves as the cylinder angle approaches 90°, but the firing intervals become more uneven, for, if A be the angle between the cylinders, the intervals will be alternatively 360° + A and 360° — A, or in the proportion of 3 to 5 in a 90° engine, 5 to 7 in a 60°, 3 to 4 (approximately) in a 50°, and 7 to 9 in a 45°. The 90° V twin is seldom or never found in a motor cycle—probably on account of the awkwardness of building it into a motor cycle frame, which is certainly to be regretted—though it is found on cycle cars.

The question of building an engine neatly into a frame brings us to the chief disadvantage of the flat twin and probably the outstanding difficulty which prevents many more firms from adopting this excellent power unit. There is no gainsaying the fact that the length of the flat twin makes it difficult to accommodate in a really neat and satisfactory manner. Of course, a special frame has to be built, but that in itself would not be a real objection, if the result were all that could be desired when it was done. On the other hand, a V twin, as we have already remarked, fits a frame nicely, and can easily be mounted in a loop frame—a type which has many advantages.

We have not referred to the outside flywheel as an advantage of the flat twin—though many excellent judges consider it a very great advantage—because it need not be confined to engines of that type. V twins, like single-cylinder engines, usually have enclosed flywheels, but this is not because they are debarred from the outside pattern, for this is not the case; outside flywheels can be, and have been, fitted to practically every type of engine with satisfactory results.

There are certain difficulties in the even lubrication of both cylinders which apply equally to both types, but these difficulties can be overcome by special arrangements. As the balance of advantages is on the side of the flat twin, we must not forget that the V provides between its cylinders an ideal place for the carburetter.

An index to the advertisements in this issue will be found on the page facing the back cover.

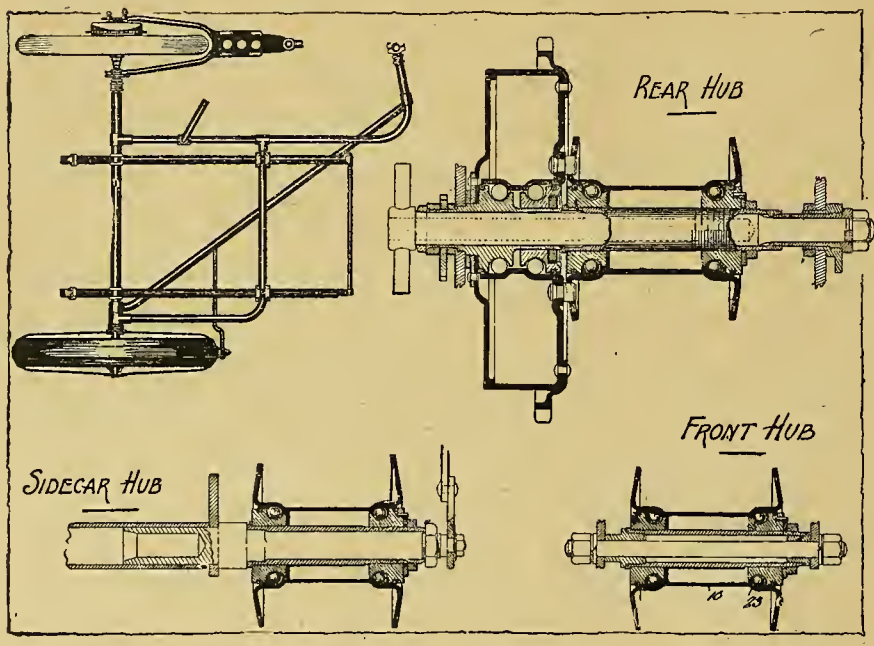
HARLEY-DAVIDSON INTERCHANGEABLE WHEELS.

A New Adaptation of a Well-tried System.

THE hub here illustrated is designed to give interchangeability of wheels for the Harley-Davidson sidecar, the arrangement being such that the hub will adapt itself to the small diameter of the front wheel axle and the greater length of the rear axle of the motor cycle, thereby giving all round interchangeability. The British patents have been applied for on behalf of the Milwaukee factory, though we have no knowledge as yet that the system is to be generally adopted. It will be seen that the hub is provided with an internal sleeve, which, in the case of the rear motor cycle wheel or the sidecar wheel, slides directly on to the spindle, being a machined fit, while in the case of the small diameter front wheel axle, the sleeve slides on to collars which are, presumably, a tap fit over the axle, so that their presence does not interfere in any way with the accessibility of the latter.

The manner in which the drive is conveyed from the sprocket to the detachable rear wheel is perhaps fully explained by the drawing. The flange of the hub fits up closely to the driving sprocket, and this flange is drilled to take a series of stub pins protruding from the inner face of the sprocket. The sprocket, it will be seen, is entirely self-supported on the axle, so that a back wheel bearing of exceptional strength and width is provided.

We presume that the pins, by which the drive is conveyed from the sprocket to the wheel hub, are to be made a very neat fit in the holes which receive them, otherwise slackness would very soon occur at this point—both the pins and the holes tending to wear oval.



A patented design of hub giving interchangeability of wheels for the Harley-Davidson sidecar.

A NEW TWO-STROKE FOR SIXPENCE.

IT is not often there is an opportunity of obtaining a £50 motor cycle for 6d., but some lucky individual will do so on Monday, July 16th. In this country the law frequently prevents "drawings," but evidently in this case it will be blind, and rightly enough, as the proceeds are to benefit the British Red Cross Society. The Newcastle-under-Lyme District Division of the Society are offering as a prize a 2¼ h.p. lightweight Triumph motor cycle, which has been ordered by permission of the Ministry of Munitions. If the winner does not wish to keep it the committee guarantee a purchaser at £50 in cash, or War Savings Certificates. The second prize is a thoroughbred Shetland pony, and it is difficult to speculate which would be the more difficult to provide with the necessary fuel of life—oats, we understand, being almost as scarce as petrol. For such a patriotic cause as this we cannot but urge our readers to respond to the appeal and to send their sixpences by the thousand. The draw will take place under the direction of the Mayor of the town, the winning numbers to be published in *The Staffordshire Sentinel* on July 18th.

Tickets are 6d. each, or a book of eleven for 5s., and may be obtained from Councillor Sidney Carryer, Chairman of the Draw Committee, or Mr. J. R. Legge, Municipal Offices; addresses, Newcastle, Staffs.

A SUGGESTED SYSTEM FOR PETROL DISTRIBUTION.

IN France most motor cyclists are allowed petrol at the rate of ten litres (more than two gallons) per day, while cars are allowed fifteen litres (more than three gallons) per day. Prevention of joy riding is brought about in another way, for a motorist is not permitted to travel out of his own district except by special Government permit—unobtainable unless the user of the vehicle can prove its absolute necessity to him for the journey in question.

AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the figures for the preceding five weeks. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C.	1914	3½ 2-speed	—	£40
A.J.S.	1916	6 combination	—	£96
,,	1914	6 combination	£58	£55
,,	1916	4 combination	—	£85
Allon	1916	2¾ 2-speed	£35	£32
,,	1914	2¾ 2-speed	—	£28
Ariel	1915	3½ 3-speed	—	£45
,,	1914	5-6 combination	—	£52
Bat	1914	6 3-speed	—	£48
Bradbury	1914	4 2-sp. sidecar	—	£43
Brough	1916	3½ 2-speed	—	£58
,,	1915	3½ 2-speed	—	£45
B.S.A.	1916	4½ sidecar	£56	£58
,,	1915	4½ sidecar	—	£56
Calthorpe	1916	2½ 2-speed	—	£34
,,	1915	2½ 2-speed	—	£25
,,	1916	2½ 2-stroke	—	£29
Clyno	1915	2½ 2-stroke	—	£27
,,	1914	6 combination	—	£65
Connaught	1915	2¾ 2-stroke	—	£24
Douglas	1916	2¼ 2-speed	—	£50
,,	1915	2¾ 2-speed	£43	£42
,,	1914	2¾ 2-speed	£34	£34
Enfield	1916	6 combination	£85	£82
,,	1915	6 combination	£65	£61
,,	1916	3 2-speed	—	£44
*Excelsior	1915	8 2-speed	—	£48
H.-Davidson	1916	7 combination	£82	£77
,,	1915	7 combination	—	£67
Henderson	1916	7 combination	—	£100
Hazlewood	1914	6 3 speed	—	£39
Humber	1915	6 combination	—	£69
Indian	1916	5 combination	—	£57
,,	1916	7-9 combination	—	£77
,,	1915	7-9 combination	£61	£61
James	1916	4½ combination	—	£65
,,	1916	2-sp., 2-stroke	—	£33
Levis	1916	2¾ Popular	£25	£27
,,	1915	2¾ Popular	—	£22
Matchless	1915	7 combination	—	£70
New Hudson	1916	2-stroke, 2-speed	—	£28
,,	1915	4 combination	—	£48
New Imperial	1916	2½ 2-speed	—	£31
,,	1915	2½ 2-speed	—	£25
Norton	1916	3½ 2-speed	—	£52
,,	1915	3½ T.T.	—	£45
O.K.	1916	2½ 2-stroke	—	£22
P. & M.	1915	3½ combination	—	£65
,,	1914	3½ combination	£40	£55
Premier	1915	2½ 3-speed	—	£28
,,	1914	3½ 3-speed	£45	£46
Rover	1916	3½ 3-speed	—	£51
Royal Ruby	1916	2¾ 2-stroke	—	£25
Rudge	1916	3½ Multi	—	£45
,,	1915	3½ Multi	—	£40
Scott	1916	3½ combination	—	£60
Sun	1915	2½ 2-speed	£22	£24
Sunbeam	1916	8 combination	—	£103
,,	1916	3½ 3 sp. solo	£75	£70
,,	1915	3½ combination	£80	£80
Triumph	1916	2-sp., 2-stroke	—	£36
,,	1915	4 countershaft	—	£53
Velocette	1915	2½ 2-sp. 2-stroke	£25	£25
Zenith	1915	8 Gradua	—	£62

Occasional Comments

"By Ixion"

The £5 Magneto Tip.

SINGLE-CYLINDER sidecar owners may be interested in a variation of the £5 magneto tip described in our issue of May 24th. This wrinkle was very simple, and consisted solely of timing the most intense spark to occur at that point of the piston travel which makes for the highest speed. Now an item—minor in effect, maybe, but still useful—in the marvellous performance put up with single-cylinder sidecars in competition by men like Hugh Gibson and Percy Bischoff, consisted of timing the "maximum" spark to occur very late, so that the most efficient ignition was obtained when the machine was revving very slowly, and clambering over the knuckle of a freak hill at one pop a minute. I am not at all sure that both the above riders did not publish the notion years ago in our columns, but anyhow it has been one of the dodges employed in that sort of work for years past.

Carburation to Suit.

ALL tuning for special jobs really resolves itself into tuning for a single engine speed. If you are tuning for Brooklands you are tuning for a set speed of 70 m.p.h., or whatever you think you must do in order to win. If you are putting a low-powered sidecar through a trial, you are tuning for the freak hill, which you hope to climb at, say, 15 m.p.h. If you are tuning for a consumption trial, you are tuning for 20 m.p.h., at which speed you must cover the course. In all these cases the carburetter should be tuned for the aforesaid set speed. Motor cycle carburetters are usually rather crude, and fall far short of furnishing a perfect mixture at all speeds. The key to tuning them is to ensure a perfect mixture at the speed set for your effort, and not to mind if the carburation is a trifle amiss at other speeds.

Tandem Four-wheelers.

I AM rather trespassing beyond the scope of this journal, but I desire to draw attention to the possibilities of a tandem four-wheeled cycle car. It has never gone down in this country, but in France and in Germany keen engineers recognised long ago that it might provide the real stepping-stone between motor cycle and motor car. Many light tandem-seated four-wheelers have been built in France. Many of us knew and liked the pre-war German Adler tandem (which was water-cooled and expensive), and another German firm built quite a lot of water-cooled tandem four-wheelers for war service in the Balkan campaign. The chief merits of the machines are that they reduce windage to the minimum (below the sidecar area, in fact), and that they afford a couple of driving types, both of which are ideally accessible. Their main defect is that their track is too narrow for comfort on any but good roads. I believe an air-cooled tandem cycle car might yet boom in this country, if we ever see decent roads again; and on our country roads the tandem might prove superior to the light car, which just fails to register with the cart ruts by a matter of inches, whereas the tandem can run with one wheel in a rut and the other out, or with both wheels between the ruts. A secondary defect is their unsociability. You do not mind having the ladies astern in a four-seated car, because you are consoled by a companion on the front seat beside you, even if he be only a male; but on a tandem you run the car off the road if you turn round for a chat, and she gets a crick in her neck if she leans forward too long.

"Some Bike."

THE other day I met a youthful subaltern walking down Bond Street and wearing that expression of sheer seraphic contentment which is normally produced only by a super-excellent dinner or a girl's "Yes!" This time my diagnosis went astray. He had really been planning his post-war bicycle, and the selection of an engine had worried him until he came across mention of a 500 h.p. eighteen-cylinder aircraft engine in Coatalen's lecture. But I was cruel in order to be kind. I asked him what transmission he proposed to adopt, and when I next met him he looked positively haggard.

Faster Uphill than on the Flat.

LETTERS continue to arrive offering advice to the owners of the two mysteriously afflicted B.S.A. machines which climb well but misfire on the flat. Capt. Lindsay experienced the same trouble on a 1911 Norton, and is perfectly definite in his statement that the fitting of new platina and a new contact breaker spring to his Simms-Bosch magneto effected a complete cure. On the level the machine behaved as if a decompressor were in action: uphill it ran as a Norton should. He also remarks that similar, but less acute, symptoms appear on engines fitted with a C.A.V. magneto, where wear has rubbed one or two flats on the fibre roller of its contact breaker. He offers no theory as to why these symptoms should be produced by the causes which he names. Several other correspondents claim to have suffered in the same way from carburetter faults. In each case they procured a remedy by changing the position of the float chamber, which was so mounted that the level in the jet rose when the machine struck a gradient, and sank when the engine was working on the level or downhill. This can hardly apply to B.S.A. machines fitted with the B.S.A. carburetter, which has its float and mixing chambers in line across the machine. Yet another soldier asserts that the symptoms always occur if he uses "substitute" on his 1912 Triumph, and disappear when he is running on petrol: he considers that they are solely due to heat. In the multitude of counsellors there is wisdom, and perhaps one of the above suggestions will put the victims out of their misery. I shall be glad to hear from them when they have found a cure.

A SHORT TRIP IN SEARCH OF HEALTH AND RECREATION.

IT was on the forenoon of Good Friday that I started from Cheltenham. I was bound for Minehead, and at the end of ninety-nine miles from the start reached this nice little seaside resort. I had never been to Minehead before, and so noticed as a newcomer its well-kept streets, curving seawall, and paved esplanade. Behind the town on the harbour side is a big headland, upon whose varied flank some houses of considerable size have their elevated location. Up in the centre of the town, which is no great distance from the front, is the original inn, "The Plume of Feathers," with its old yard of irregular cobble paving, and quite comfortable interior. Here one is well treated at a moderate charge, and given friendly information about the stag-hunting on the moor. It was due to this civility that I had the unexpected pleasure of participating in the hunt. I was informed that it was the season for hunting the hind—that is, the hind that this year was failing in maternal duty to provide due increase to the herd.

The meet of the Exmoor Staghounds was at Cloutsham—a small hamlet situated on the moor about seven miles from Minehead. I rode thitherward along the Porlock Road and down a lane to the left that led through the village of Luccombe, and then rose to cross the moor to Exford up a hill sufficiently steep for any mount. At the top one found oneself upon the open moor, the road having degenerated into a narrow track that ran without fences through a terrain on either side of stony surface, more or less covered with heather, now all dark brown and dead-looking. From this high point a dozen square miles of moorland country was visible, consisting of a jumble of steep hills and deep bottoms, with patches of woodland. The elongated bulky top of Dunkery Beacon, which is the highest ground of Exmoor, lay in plain view about three miles off.

A Meet of the Staghounds.

On the further edges of the landscape, in this direction and that, cultivated stretches of country were in view, with two or three sets of farm buildings, a lone house, and part of a village.

A party of Welsh visitors had run up from "The Feathers" at Minehead in a motor car, and these, with a second party in a pony-cart, had come to a permanent stand on the moor, and I joined them to learn that the road to the actual *venue* of the meet was difficult and not worth traversing, as the hounds always came up to draw the woods which were in sight. A few horsemen straggled past us to the meet, and presently we saw the hounds with the master, huntsman, and whipper-in, in their red coats, accompanied by the assembly, coming up out of Cloutsham into sight, at a distance of a mile, and riding towards us. They came over and separated, a part of the hounds going over the hillside on our left and down the bottom beyond out of sight, directed, no doubt, by the information of the harbourer.

Across the Moor.

A quarter of an hour later, with the sound of the horn and the baying of hounds behind them, a herd of six, consisting of five stags and a hind, came up and passed within sixty or eighty yards from the spot to which we had moved. A horseman raced them across the high ground, slamming his whip as he rode, and one of the red-coated men came up behind blowing a long blast from his horn; the hounds followed, but the deer easily ran out of reach down the steep slope and up the opposite side to a small thin copse, where they halted and gazed around in a considering attitude ere trotting over a hill top into a greater wooded valley beyond. The sport required the hind to be separated from the rest before the hounds could all be put on the trail and the real hunt begin. From where we stood we saw them pass in and out of sight several times at varying distances up to perhaps a mile-and-a-half. On all the prominent hill-tops around were onlookers, some mounted, some on foot, and a considerable part of stag-hunting on Exmoor is evidently merely moving from hill-top to hill-top, so as to keep the hunt in view, though often at considerable distance. This was what happened during the two-and-a-half hours I looked on with the party to which I had attached myself, not entirely on account of the luncheon basket that they had brought up, the contents of which they presently asked me to share. We all sat down together on the moor to regale ourselves amongst the heather and maroon-red stones of the old red sandstone, whilst the sun showed a befittingly bright face, beaming down upon us to modify the keenness that was in the air at that considerable altitude. A hawk of unusual species hovered for a time in the sky just in front of us, and a pipit having risen to a short height wavered back with a thin song to earth; but wild animal life is not greatly in evidence on the moor.

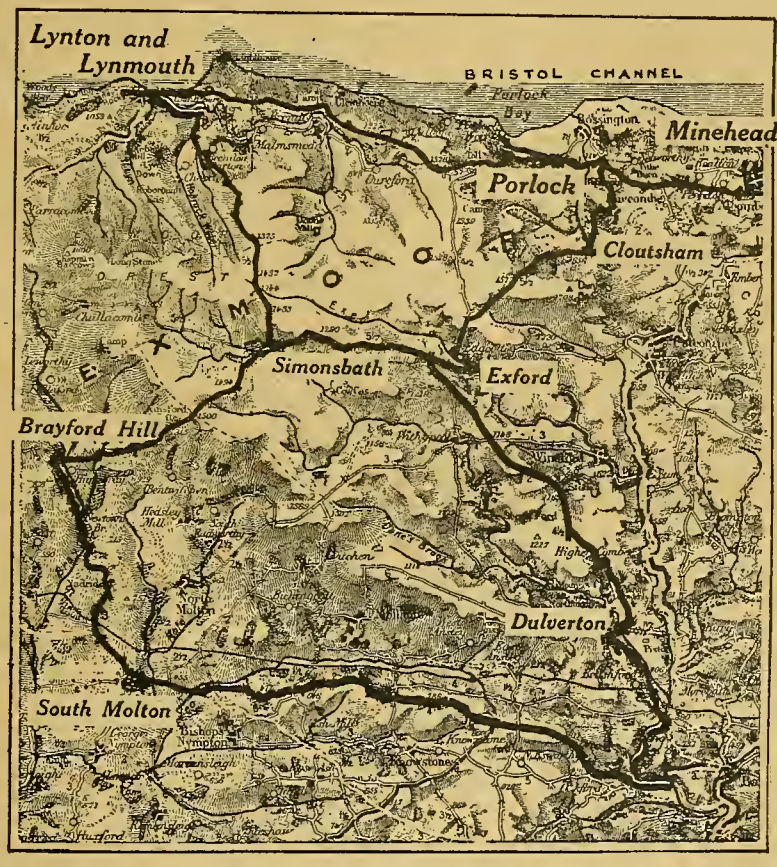
My holiday was intended to be a rolling one, however, and the hunting was adventitious to the main

A Four Days' Excursion to Exmoor.—

idea. I had to traverse the road across the moor, though a plain notice was posted up to the effect that "This road is not suitable for motor vehicles." It led me down a steep hill upon a ledge, with a nearly sheer drop on the right to a very pretty and romantic valley. It brought me to a stream which it was necessary to ford, and, being a novice at fording streams on a motor bicycle, I went straight at the ford without any preliminary inspection as to the depth of the water and the condition of the bottom. Not only was the water too deep at the part where I took it, but there were some large loose stones in the way which stopped my engine, and I had perforce to put my feet to the bottom in mid-stream. That meant wet and cold feet for the rest of the day.

Arriving at the bank I tried the engine doubtingly, and was overjoyed when it fired at the second kick. Some way along the valley the track forked, the way to the right was up a precipitous slope, where naked rocks stood out across the fairway. I chose the lower rough track by the brook, therefore, but soon had to return, the nature of the way indicating that it could lead to nowhere in particular, and another and deeper ford lay across it. So I came back to the steep rough hill, where the gradient was tremendous, and required the third gear of the hill-climbing Brough I was riding. By a further stretch of some miles of atrociously rough road, I crossed a fine piece of moorland lying at an altitude of over 1,500 feet. At the highest part I dismounted to take a glance around, and, looking back, found a splendid view of the Bristol Channel showing there, with a long line of the Welsh coast on the opposite side very clearly in view.

At Exford I found the River Exe, that had risen on the moor five or six miles above, with a good-sized fishing and hunting hotel, a scattering of houses, and the kennels of the hunt. I did not care for the notion of stopping here, and so took the road for Simonsbath. The six miles between the two places I found possessed a fair road between high bank fences, with a beech hedge on the top of the banks that was partly covered with the dead brown persistent leaves of last year. I saw about here a large long-legged wolf-like fox, that leapt down the bank on one side and up the opposite one a few yards in front of me. Simonsbath I found to be a minute village, with a little church, a cottage post office, one or two rather large houses, and a fishing and hunting hotel as at Exford. The River Barle, tributary of the Exe, makes a pretty valley here, with a considerable growth of larch, fir, and other trees clothing the slopes.



The Exmoor district, showing the route traversed.

The Devonshire Roads.

At this juncture my cold wet feet were producing their maximum effect upon my spirits, and I thought the virtue of living would be enhanced by some tea. I therefore entered the "Exmoor Forest Hotel" at Simonsbath, and ordered accordingly. A fisherman came in whilst I was having tea, and I gathered from him that the sport was not good owing to the cold weather. The question now with me was where I should spend the night, and on consulting the map I thought South Molton, distant about a dozen miles, seemed most accessible. My fisherman gave me the direction for the best route, which was not the nearest one. Out of the Barle Valley I rose again on to the high moor, and before descending to South Molton, which lies below its south-west edge, I had a fine view of the typical Devonshire country stretching southward from the moor, with its hundred hills, and the high dark ridge of Dartmoor showing away on the right. The Devonshire roads are no better than when I was last upon them. Even the main Barnstaple road that I struck before reaching South Molton was full of holes. That immediate million still requires to be spent to put the roads of this county into good condition. At the "George Hotel" at South Molton, I met quite a company of fishers, both men and ladies. The opportunity of fishing is made here by the Rivers Mole, Yeo, and Bray, whose waters reach the Taw that flows seaward to Barnstaple.

On the morrow, which was Sunday, I left towards mid-day for Dulverton, which I had been informed was

A Four Days' Excursion to Exmoor.—

the fishing metropolis of these parts. Along the Yeo Valley there were many scenes of small sloping fields and green meadows dotted with white sheep with their new-come lambs. I got over a ridge out of this valley, however, to descend into the valley of the Exe at Oakford, about six miles above Tiverton, and crossing this river by a bridge here, where the water was coming down in a copious rocky stream, I turned sharply back and up a steep hill, then down again to the water side of the Exe, and a mile and a half before reaching Dulverton town, passed the railway station of the same name, close to which is situated the large "Carnarvon Arms Hotel," that paradise for the wielder of the fly-rod. I learned that there is ample opportunity for fishing here, whether you stay at the "Carnarvon Arms" or at one of the inns in Dulverton, especially for the owner of a motor who can run for a few miles to one part or another of the several streams in the neighbourhood.

Across Exmoor Again.

Having looked at Dulverton and its streams, and asked questions as to the fishing, I began to think where I should go next. My map showed a road straight across Exmoor from Dulverton to Lynton. That appealed to me, and I was soon climbing the long incline that brings one again to the higher regions of the wild moor.

The author, J. H. Garrett, M.D., with his 3½ h.p. Brough outside the Cheltenham Municipal Offices ready to start on the tour.

The road brought me within a mile of Exford, and then along by the way I had previously traversed to Simonsbath. Beyond Simonsbath I rose on to the wildest portion of the moor I had yet seen. No cultivated ground was in view, and no woodland. Bare hills were everywhere extending one beyond another, with rounded tops, and steep sides which went down abruptly into deep combes and bottoms whose ultimate depths were out of sight. The whole surface was covered with the brown brush of the dead heather, and I thought of the beautiful sight that must here be presented when the heath is in full bloom. The sun was shining through a storm cloud over one brown barren hill-mass, and in another place, near where streams of rain were descending, one leg of a rainbow went down behind a slope, and in front of a dark part of the sky, into the depths of the valley beyond the hill. Further round a long smoke streamer was stretching itself out from the side of a more distant hill, where probably the grass and heath had been fired. On the horizon, cut out quite clearly against the sky line, I counted four of the wild red deer. The very rough narrow road by which I was crossing this brown moorland, and upon long stretches of which large roughly broken stones had been cast without any thought of being rolled in, led towards the deer, who, when they heard the noise of my engine, disappeared over the hill top. The road intercepted them, however, and I came to within one hundred yards or so of them, and saw they were four hinds.

After some more miles of rough road, I began again to see cultivated country, and came down off the moor by a narrow banked lane, and, near where a couple of beautiful mountain brooks make "Watersmeet," I ceased my descent towards Lynmouth, and turned to the left up a steep slope and went by a road that in a mile or two of up and down course brought me to Lynton.

The Coast Road.

During the night there came some considerable showers of hail and sleet at Lynton, and when on Monday morning I started to come back by the coast road to Minehead I found the hill that goes straight down to Lynmouth in a muddy and skiddy state. As a main road hill this is no doubt one of the steepest and most difficult, to go either up or down, that is to be met with in the country. The high road that runs along towards Porlock was in a bad state, having been recently remetalled without rolling. This is noticeable upon long and oft-repeated lengths.

Afterwards I passed again through Minehead, and stayed the night at Burnham. On Tuesday morning I left for Cheltenham, and finished my holiday by arriving home non-stop from Burnham, the distance being seventy miles through Bristol and Gloucester.

I may add an interesting word as to the going of my mount, the 3½ h.p. Brough, which I purchased new last season and have ridden 3,700 miles. The machine has proved very reliable, is a comfortable mount, and easily managed. It did the above run of 320 miles without being attended to anywhere. As will be seen by the photograph, it is fitted with foot plates, which are of aluminium. The pair of Dunlop heavy 2⅜in. tyres are looking quite like doing a second 3,700 miles. The Thomson-Bennett magneto has given no trouble whatever. In the above tour my consumption of petrol (Pratt's No. 2) was just four gallons for the 320 miles. For general touring and town work I use a No. 29 A.M.A.C. jet. For climbing Nailsworth Ladder, or rushing ordinary hills at forty miles per hour, I might require the No. 32 supplied with the machine.

Test of a British Fuel.

ARBECO—A COAL-TAR DERIVATIVE OF THE BENZOLE SERIES.

SOME time ago we received for testing purposes a sample of Arbeco motor fuel. Previous to trying Arbeco we had heard excellent accounts of its behaviour on cars and motor cycles. In this connection it may be mentioned that heavy fuels have a much better chance of success on air-cooled engines, as owing to the extra heat retained by the air-cooled engine, vaporisation is greatly assisted. We tested Arbeco on a 4 h.p. War Office model Triumph, first using a quart of Arbeco to three quarts of motor spirit, no difference being noticeable either in starting or running—except for the odour, which is reminiscent of almond flavour. Later we increased the proportion to half and half. Again no difficulty was experienced in starting the engine and running, and as no knocking was experienced nor the speed of the machine affected, we progressed to three parts Arbeco to one part petrol. Starting was now impossible from cold, and the only thing to do was to inject petrol liberally into the compression tap to obtain the initial explosions, when the engine would continue to run quite satisfactorily. The distillers—Messrs. Robinson Bros., Ltd., Ryder's Green, West Bromwich—assure us that the engine will run well on their fuel alone during uniformly warm weather, which we do not doubt for one moment. It may be remarked that the carburetter or machine were not altered in any way. With a small tin of petrol for starting purposes, and the main tank full of Arbeco, the fuel difficulty should be solved. We are now able to furnish the constituents of Arbeco. This fuel is wholly a coal tar derivative of the benzole series, although not actually containing benzole. It flashes a degree or two higher than 73° Fahr., or about 10° lower than ordinary paraffin. As regards its price, 2s. 9d. per gallon retail is charged, and it can be obtained from the address named by licence, or the company will deliver it free to carriers in forty-gallon casks. It is good to know that the quantities available are large, though not unlimited.

Is the Featherweight Sidecar Practical?

If so, it cannot be Cheaply Made.

HAVING had very considerable experience with lightweight sidecars of various kinds, the writer was particularly interested in the notes which recently appeared in this journal on the subject of lighter sidecar outfits. It is to be taken that most practical riders will agree with "Chinook" in advocating the mediumweight outfit, on the lines of the 4 h.p. A.J.S., in preference to the monstrous affairs weighing almost twice as much, but my experience is that the true featherweight sidecar is still far from an accomplished fact.

In my eagerness to convert a 3½ h.p. two-speed machine into a go anywhere passenger mount, I "fell upon the neck" of the featherweight sidecar when first it began to command notice. At first I was vastly enthusiastic, but since then my experiences have been somewhat assorted. In the first place the pamphlets issued by many sidecar manufacturers are somewhat misleading as regards weight. I doubt if there is a featherweight sidecar on the market which, fully equipped and with the necessary couplings, weighs under 80 lb. Additional stays are usually necessary, and my own featherweight, which was catalogued at 50 lb. complete, weighed 85 lb. without the couplings when delivered. Necessary additions have brought the weight up to 100 lb., or within 15 lb. of the properly finished attachment turned out by the makers of the motor cycle—an attachment which makes no pretence at lightness as a recommending feature, and presents none of many weaknesses of the "featherweight" I purchased.

Light—Not Necessarily Cheap.

It is well, therefore, to go thoroughly into the weight question before purchasing a featherweight solely on account of its alleged lightness, and one must realise that practice will probably demand the addition of at least two stays before the outfit is truly roadworthy.

There are many motor cyclists who desire a featherweight sidecar for use in conjunction with their solo machines. They desire it not because it is cheap, but because it is light. They are willing to pay as much for it as they would pay for the mediumweight outfit the makers recommend for the cycle, or perhaps might go to a little more if by so doing they could obtain the desired combination of strength and lightness. They do not desire a featherweight that has to be converted into a mediumweight before it is safe and reliable; neither do they require an attachment the weight of which has been cut down simply to attain a popular price.

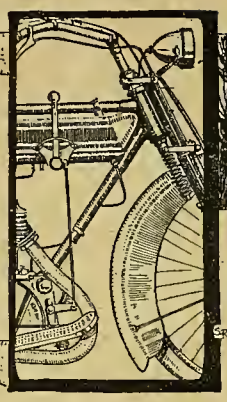
No one objects to paying a good price for a good article. The firms that find the grumblers are the firms that turn out a shoddy article at a shoddy price, and the sidecar is altogether too unmechanical to permit of liberties being taken in the matter of weight. Lightness can only be attained by simplicity of construction, by correct design, and the employment of good quality materials, and private purchasers must not at present imagine that price and weight can be cut down in proportion with one another, and yet an adequate degree of efficiency retained.

We have arrived back at the point from which we started. Is sidecar design sufficiently advanced to permit the timely arrival of the featherweight? Personally I doubt it. The featherweight sidecar, though far from new, is still in the experimental stage, and a straight tube, triangulated design is the only thing which will make its production a matter of standardisation. The designer of the Scott Sociable would be an excellent man to tackle this problem.

H.B.

OVERHEAD VALVES.

How to obtain Full Advantage of Valves placed in the Cylinder Head.



I MAY say at once that I look forward to a considerable amount of criticism of this article, as the subject I bring forward has probably caused more diversity of opinion in the motor world than has any other single subject.

It must be admitted that until comparatively lately those people who have been against the overhead valve arrangement have had very good grounds for their objections. With the advent of the aero engine, however, and advances in the science of metallurgy and its proper application to engines, the greatest danger of the overhead valve system, viz., that of a valve breaking and its head dropping into the cylinder, disappears, and this enables us to consider the various advantages of this type of valve arrangement over others.

Reliability of the Various Arrangements.

The best proof of reliability for the o.h.v. system is its extensive application to aeronautical engines. I have personally supervised numbers of tests of the better known engines with overhead valves up to periods of fifty consecutive hours at full power. The valves when taken out and carefully examined have shown practically no signs of pitting or breaking. I do not wish to infer that the o.h.v. system is more reliable than the side valve, but it is, provided the right materials are used, its equal for reliability. This is a point which the average motorist quite rightly places first, but in the present state of metallurgical knowledge there is no excuse for broken valves in either side or overhead arrangements.

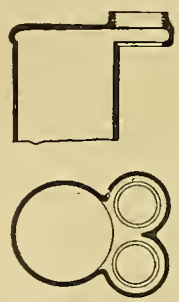


Fig. 2.—Uneven distribution of metal, giving distortion. Note restricted gas passage.

Although for a long time the overhead valve system has been used on racing engines, and is universally recognised as the best for that purpose, I propose to point out more fully than has yet been done exactly why it is better, and how far it is possible to incorporate the advantages in standard type engines.

The outstanding feature, when one compares the combustion head of the o.h.v. engine with the other systems, is the compact shape of the combustion chamber. It is free from ports, etc., in direct communication with the cylinder bore, as shown in the diagrams given. The area of the combustion chamber in fig. 1 is clearly less than in either fig. 2 or fig. 3, which show respectively the arrangement of both side valves and one overhead valve.

Fig. 1.—Elevation and plan of a cylinder, showing the even distribution of metal and consequent freedom from distortion. Observe the free gas passage.

Now, a petrol engine being a heat engine, we desire to use as much heat as is possible for the expansion of the gases, as this will mean greater power for a given amount of petrol, and consequently lower petrol consumption. The cylinder head, which has a minimum area exposed to contact with the gases, consequently extracts a minimum of heat from them, and economises petrol. Thus the first advantage is lower petrol consumption, this being a notorious fact, as the o.h.v. engine has many times proved its thermal efficiency.

Even Heat Distribution.

Another advantage lies in the metal and heat distribution of the overhead valve engine. There are no large masses of metal, such as valve caps and valve pockets, which, in the ordinary type of engine, retain a considerable amount of heat. This heat, instead of being evenly distributed around the cylinder, is usually concentrated over one side only. Thus, however true the cylinder bore may be when new, it is hardly likely to remain true, owing to the one-sided distortion which takes place. When the cylinder distorts out of truth there is a loss of compression, with consequent rapid increase of petrol and oil consumption. Another trouble directly due to uneven heating is that of cracked valve seats. Both these troubles are well known.

The foregoing remarks apply in a certain degree also to the arrangement of one valve over the other, though in this case the likelihood of trouble is somewhat reduced.

Summing up the overhead valve system, it may be definitely stated that it is more efficient for a given size than any other, using the word efficient in its proper sense, viz., as giving a greater proportional power output for a given petrol consumption. The writer does not consider it necessary to enlarge further on the o.h.v. arrangement,

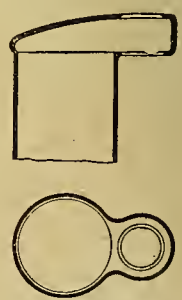


Fig. 3.—A better design than No. 2, but not so good as No. 1.

Overhead Valves.—

but will collect its advantages together as follow:

(1.) Even metal and heat distribution, with consequent abolition of distorted and cracked cylinders.

(2.) Better shaped combustion chamber and valve ports, giving unrestricted passage to gases.

(3.) Lower petrol and oil consumption.

(4.) No hot side to engine.

(5.) Greater all-round efficiency.

Therefore we may expect longer life for the o.h.v. engine, and it must retain its power over longer periods than other arrangements permit. I will now pass on to a consideration of valve arrangements, and illustrate some of the better known and more reliable forms.

Fig. 4.—Parallel valve arrangement, limiting the size of the valves.

Discussion of different o.h.v. Arrangements.

As there are at present few well-known overhead valve gear arrangements for motor cycles in use, I am going to introduce what, it must be granted, is the best example of the o.h.v. type of gear, viz., as used on aero engines—in addition to motor cycle arrangements.

The most common type is that in which the valves are mounted parallel to the cylinder bore, and are operated by means of rocker arms and long push rods (fig. 4). This system has the defect of limiting the diameter of the valves, and, in addition, one side of the cylinder gets considerably hotter than the other—a defect we wish entirely to avoid. Several aero engines have the valves parallel as shown, but the head of the cylinder is swelled out as in fig. 5. This arrangement, however, is a poor one, and limits the use of the full valve diameter. A better arrangement is shown in fig. 6, which illustrates a very well-known type of engine. In this system the valves are mounted in the head obliquely to the cylinder bore, and are operated alternately by a single rocker. The spring employed to hold the valves is a leaf spring. The rocker is connected to a long rod as shown, and is alternately pushed and pulled by the cam. It can be seen that this gear is too noisy for motor cycle work, as the end of the rocker is some distance from the end of one valve when operating the other, and in coming back strikes the valve end with considerable force. The feature of the system to which I desire to draw attention is that by arranging the valves at an angle in the head they are isolated from the actual bore of the cylinder, and do not tend to heat the walls as do the other arrangements. Also, the whole diameter of the valve is available for the passage of the gas, and we thus fill and empty the cylinder with greater facility.

Fig. 5.—Parallel valve arrangement, with the head swollen out to receive valves.

A rather important drawback to the arrangement of o.h. valves is the noise and wear set up owing to the somewhat crude operating mechanisms, which so far, and with practically no exceptions, have been used. The usual arrangement of long and rather weighty push rods with rocker arms, entailing a number of joints unlubricated and unprotected, compares badly with the usual fully enclosed operating gear of the side-by-side valve. Such an arrangement is fit for track work perhaps, but certainly not for serious road work. One outstanding example of enclosed and lubricated valve gear is found in the M.A.G. engine, and it is freely admitted that, in so far as noise is concerned, this type of engine is as quiet as the side valve type. There is, in my opinion, no reason whatever for not enclosing the entire valve gear on an overhead valve engine, this being done on the lines of the M.A.G. and 3 h.p. Enfield.

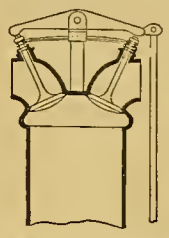


Fig. 6.—Valves at angle to cylinder bore and alternately operated by the same rocker.

However, another method is used on very many aero and car racing engines. In this the camshaft is placed on top of the cylinders and driven by means of bevel or spur gears. The valves are operated by means of short rocker arms. When properly carried out, this method has the advantage of a small number of moving parts, which are easily encased and lubricated (fig. 7).

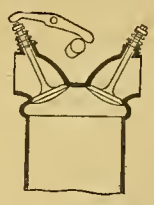


Fig. 7.—Valves at angle to cylinder bore, with overhead camshaft and rocker arms.

Conclusion.

It is hoped that the above remarks may raise a useful discussion on the systems in use, as for some years no important difference in valve gear design and operation has been offered to the general public. The present war has improved the breed of aero engines to an enormous extent, and there is no doubt that much could be done in a similar way for motor cycle engines. If our engines can be made more efficient we shall see a general reduction in weight, as smaller engines will be capable of doing the work which large ones do now, with consequent reduction of all-round expenses.

A.A.S.

RACING IN NEW ZEALAND.

The Rider of an Eight Valve Indian makes a Sensational Performance.

SOME extraordinarily fast times were recently put up on the Ashhurst Racecourse, New Zealand, where Coleman, the rider of an eight valve Indian, broke the world's grass track record (unofficially) and is reported to have exhibited some marvellous riding, his cornering being hair-raising. In a magnificent race, in which machines of various c.c. competed, Coleman covered the seven miles in 6m. 37⅖s. Douglas, Rudge, and Triumph machines also figured conspicuously, and the grass course, though dusty, appears to have been in good trim for speed work. The racing carnival was held by the Manawatu Motor Cycle Club in aid of the Ashhurst Patriotic Fund.

MILITARY NOTES.

"HOSEABLE" WHEELS MADE FROM PETROL CANS.

L.CE.-CPL. D. DALBY (M.T.), whose 4 h.p. Triumph equipped with disc wheels we illustrated a fortnight ago, writes, in reply to the interrogation we made, that a chum and he made the discs out of petrol tins, and up to the present they have proved an entire success. In mud they are at least as good as wire wheels, and in windy weather there is no difficulty in steering if only the rider takes ordinary care. The outstanding advantage in employing disc wheels is, of course, the simplification of the cleaning process, a swill down sufficing to do all that is necessary.

A PICTURE FROM PALESTINE.

THE photograph accompanying is of particular interest to our readers. It shows two despatch riders in Egypt, the pole at the left of the view denoting the boundary line between Palestine and Egypt. The machines shown are 4 h.p. W.D. Triumphs with the new type handle-bars, and the point to observe is the amount of kit they are carrying, the riders having divested themselves of all spare clothing for riding in this hot climate. Photographs from every fighting theatre have appeared in these columns from time to time, thanks to the kindness of appreciative readers of *The Motor Cycle*, but the present print is the first to reach us from the Holy Land—a new fighting territory now that British troops have driven the Turks over the Egyptian border.

THE ARBUTHNOT TROPHY.

LAST Thursday was the anniversary of the Battle of Jutland, in which so many brave officers and men of H.M. Fleet made "the great sacrifice," and among them that famous Admiral, Sir Robert Arbuthnot, Bt., K.C.B. It has occurred to us that it would be a very good plan if, when peace reigns on the earth once more, and the Arbuthnot Trophy is competed for, the date of the competition were fixed for, or as near as possible to, May 31st.

NEWS OF IRISH MOTOR CYCLISTS.

SOME prominent Irish motor cyclists in different roles of the world war are referred to in the current issue of *The Irish Cyclist*.

Lt. J. A. H. Day, Royal Flying Corps—a member of the Dublin and District M.C.C.—is serving in France as a pilot, and has been through a good deal of fierce fighting of late. Though his plane was hit on more than one occasion and his observer injured, he has so far come through without a scratch.

"Barney" McManus, R.E.—a member of the Ulster Centre of the M.C.U.I., who regularly competed in Irish motor cycle competitions of pre-war days—we regret to hear, has been drowned at sea.

Lt. Noel E. Drury, Royal Dublin Fusiliers—formerly a T.T. rider—who has already seen service on the Balkan Front, and came home for a period of light service owing to an injury to his eye, is under orders to return to the Balkans.

WITH THE KITE BALLOONS

THE former assistant secretary of the Auto Cycle Union—H. P. Beasley, Sec.-Lt. Royal Flying Corps—recently left for an Overseas destination.

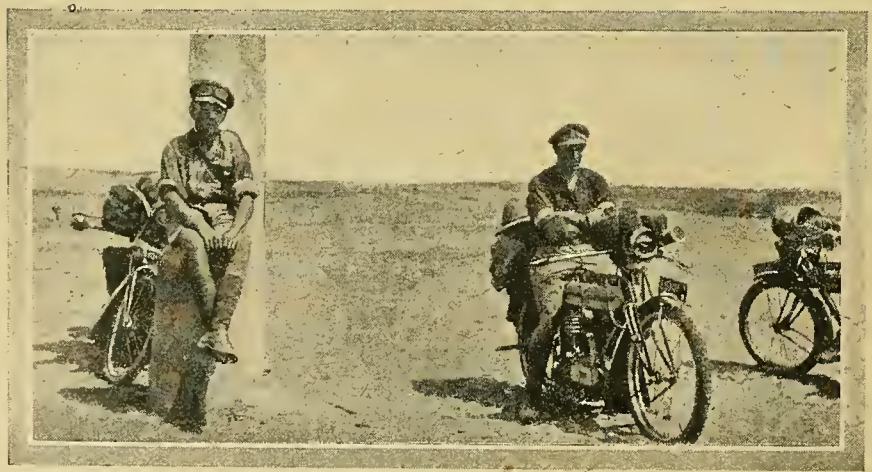
2nd Lt. H. P. Beasley, formerly assistant secretary of the A.C.U.

Beasley enjoys a large circle of acquaintances by reason of his share in the successful organisation of many of the big trials of the past, notably the Tourist Trophy Races and the A.C.U. Six Days events. He is at present an equipment officer to a kite balloon section, and when writing us on the eve of his departure, reported that he was getting along famously.

THE NEW TANK BADGE APPRECIATED.

ONE of the early recruits in the Motor Machine Gun Service was A. W. Bedford, who was subsequently transferred to the Heavy Section, Machine Gun Corps. Sgt. Bedford, who was with the first company of "Tanks" that went out to France, was in the first attack on the 15th September last year. After a spell on the Somme he is back again in England recovering from an attack of pleurisy. He writes us in appreciation of the Army Council's action in issuing a special "Tank" badge to the men of the Heavy Section, M.G.C., and, further, comments favourably upon the design, which was shown in our issue of May 24th.

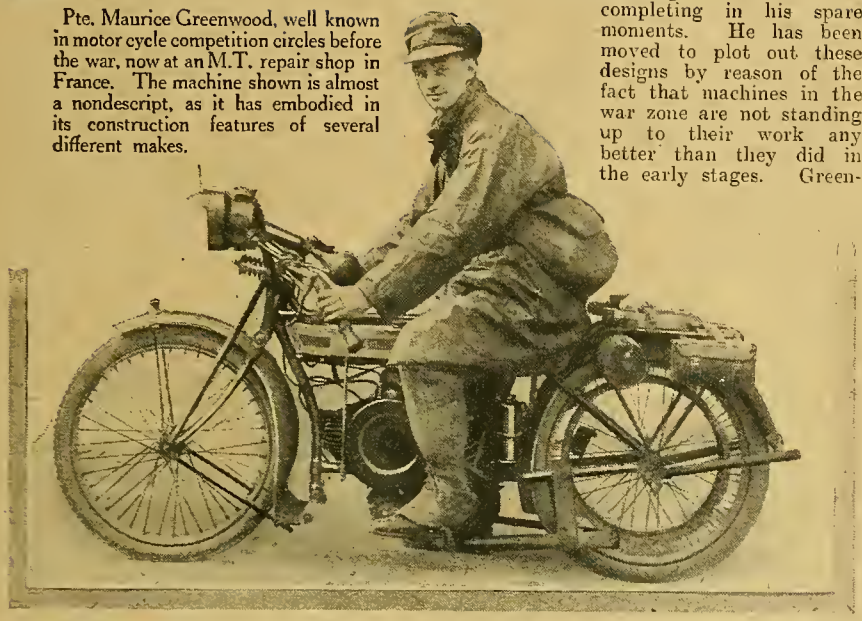
No doubt many of our readers have now seen men of the Heavy Section wearing the new badge. We ourselves have seen three examples, and observed with interest the amount of notice that was taken of the distinctive design.



AN ANCIENT BOUNDARY LINE.
A despatch rider seated on the post which denotes the border of Palestine and Egypt.

Military Notes. —

Pte. Maurice Greenwood, well known in motor cycle competition circles before the war, now at an M.T. repair shop in France. The machine shown is almost a nondescript, as it has embodied in its construction features of several different makes.



drawings of which he is completing in his spare moments. He has been moved to plot out these designs by reason of the fact that machines in the war zone are not standing up to their work any better than they did in the early stages. Greenwood is in a position to judge, as fully fifty per cent. of the machines which reach his base arrive with broken frames, and both motor bicycles and sidecars suffer in the same manner. It is perhaps needless for us to throw out a reminder that military machines are subjected to the worst possible treatment, which accounts for this large number of breakages.

The photograph accompanying shows Pte. Greenwood mounted on a 2¾ h.p. Douglas, with a number of sweeping alterations which he has effected. The most notable is the substitution of Triumph spring forks, Triumph T.T. bars, the same make of front and rear mudguards, a Claudel carburetter, ⅜in. belt and variable pulley, 2½in. tyres, B.S.A. footrests, and a long exhaust pipe. The engine, too, has received a certain amount of doctoring. The pistons and connecting rods have been lightened, the valve caps have been drilled out and radiator plugs fitted, on the same lines as the Ariel machine, and altogether, we are told, the machine has given excellent service.

AMERICAN LADY MOTOR CYCLISTS AS D.R.'s.

A SHORT time ago we published a photograph of the sisters Augusta and Adeline Van Buren, who, it will be remembered, crossed the continent of America on Indian motor cycles. The adventurous girls have now offered their services as despatch riders to the U.S. Government.

SPRING FRAMES AND FRAME BREAKAGES.

ANOTHER interesting communication has reached us from Pte. Maurice Greenwood, who is in an M.T. repair shop at a base in France. Greenwood took part in the memorable trip to Grenoble for the International Six Days Trial in 1914; at that time he was riding a two-stroke Connaught. He rode a 3½ h.p. New Imperial in the A.C.U. Six Days Trials at Carlisle in 1913, and also won a medal in the London-Exeter-London run, driving an 8-10 h.p. L.M.

Greenwood tells us that he has two promising designs of spring frames, the

A REAL SKY PILOT.

THE Rev. R. M. Bankes-Jones, curate of Sunningdale, Berks., before the war, an enthusiastic motor cyclist, and at times a contributor of touring articles to *The Motor Cycle*, has relinquished his post as an Army chaplain so that he may train as an R.F.C. pilot. Here he will undoubtedly meet many kindred spirits, and we wish him the best of luck and a safe return to *terra firma* every time.

Rev. R. M. Bankes-Jones.

A PICTURESQUE ANALOGY.

PHILIP Gibbs, the famous war correspondent for the *Daily Chronicle*, describes our motor cyclists as they flit along the dusty roads of France as: "Despatch riders weaving like shuttles through the tangled skeins of traffic are grotesque figures, as though they had rolled themselves in flour before mounting their motor 'bikes.'"

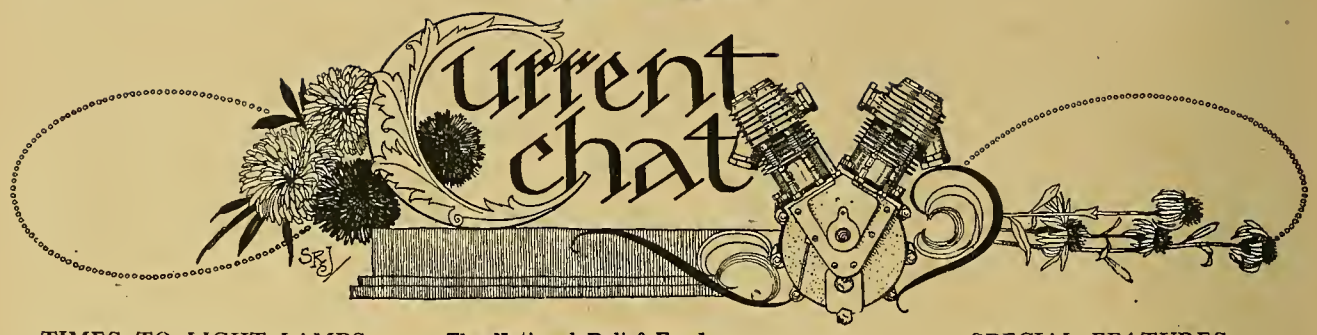
FROM A DISTANT FIGHTING FRONT.

DVR. G. H. BULL, of the H.A.C. Overseas, writes: "I have just received *The Motor Cycle* for April 19th. I wonder how many people were aware of the tremendous speeds attained by some parts of a motor cycle engine? I wonder, too, whether anything will ever be done in regard to internal cooling?

"While examining a D.R.'s 1917 Triumph, in company with three Australians, one remarked that the machine was the neatest and most compact he had seen. Naturally the talk turned to motor cycling in Australia. I asked what kind of machine he preferred for his part of the country, and he told me the Douglas and Triumph. The average design would not successfully stand up to the conditions in his district for more than a year.

"Jolly good luck to the Blue 'Un (by the way, an excellent tonic for the removal of the 'blues'").

DESPATCH RIDERS OF THE 2ND CANADIAN DIVISION SIGNAL CO.
From left to right: Cpls. Macay, Austin, Smith, Burgess, Mason, Sgt. Frow, Cpls. McEwen, Roper, Hall, Knowles, and Broomhall.



TIMES TO LIGHT LAMPS.

Summer Time.		
June 7th ...	...	9.41 p.m.
,, 9th ...	...	9.42 ,,
,, 11th ...	...	9.44 ,,
,, 13th ...	...	9.45 ,,

The £100 Car (?)

In view of current prices of some sidecar outfits advertised in our miscellaneous columns, the question appears to be the production of the £100 combination. Yet the £100 car is being talked about.

Some Lightweight!

The following advertisement appeared in the *Dublin Evening News:* "Lightweight, 22 h.p., new tyres, saddle, belt, B. and B. accumulator; perfect running order; £6." Perhaps the saddle, belt, and B.B. accumulator account for the phenomenal power!

Modernising the Farmer.

7,000 farm tractors are to be put in hand at once. Tenders by motor manufacturers are now under consideration. None of the tractors will be offered for sale, as they are intended for use in the Government ploughing scheme. They will be named M.O.M. (Ministry of Munitions), and the design is by Mr. Henry Ford.

"Swank."

We frequently notice motor cycles carrying the A.C.U. foreign touring plate bearing the magic initials G.B. Some of these machines have changed hands several times, and the owners who affixed the plates, in many cases, have been in khaki since 1914. We have even seen 1916 models with the plate attached—no doubt removed with other gadgets from the old machine.

Motor Cars for Hire.

In accordance with the provisions of the Defence of the Realm Regulation, the letting of a motor car for hire is authorised for the following special purposes:

(1.) For the conveyance of any goods or burden in the course of trade or husbandry in a motor car which was constructed or adapted solely for that use prior to the 12th May, 1917.

(2.) For visiting persons who are dangerously ill and for conveying nurses to attend patients, provided that in each case a certificate is obtained from a duly qualified medical practitioner.

(3.) For funerals.

(4.) For the conveyance of police officers engaged upon their official duties.

(5.) For the conveyance of newspapers for distribution.

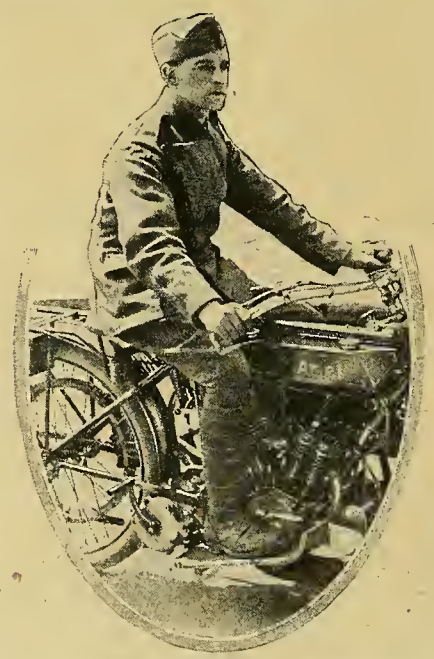
The National Relief Funds.

At the week-end the principal relief funds stood as follows:

The National Relief Fund (distributed £3,608,015)	£6,195,514	0	0
British Red Cross Fund	6,727,385	4	11
Tobacco Fund	130,580	0	0

A Former Secretary of the Motor Cycling Club.

Last week we met in Northumberland Avenue Ernest Arnott, who was hon. sec. of the M.C.C. in the days of long ago when this journal first saw the light. Arnott was then agent for Werner motor bicycles, and on this machine broke the Land's End-John-o'-Groat's record in 1902. The Werner was considered one of the most up-to-date machines on the road on account of its vertical cylinder. Arnott is now employed by the Board of Agriculture, and instead of devoting his attention to motor cycles concentrates his energies on motor ploughs and agricultural matters generally. He is naturally well fitted for this type of work on account of his long experience with the internal combustion engine, and the fact that he farmed for a good many years in the New World.



S. F. Watson will be recalled as a leading exponent of Ariel motor cycles and rider in the Six Days and other trials. After considerable experience in volunteer work he has joined the Royal Flying Corps. The machine he is riding will be recognised as a 5-6 h.p. twin Ariel.

SPECIAL FEATURES.

OVERHEAD VALVES.
AN IRISH LADY'S ENTHUSIASM.
FOUR DAYS' EXCURSION TO EXMOOR.

An Obscured Number Plate.

There was a foolish and vexatious prosecution at Bromley last week, a motor cyclist being summoned for riding a motor cycle with the rear number plate obscured, the police evidence being that the numbers were covered by the rider's coat tails. The Bench dismissed the absurd charge on payment of costs—4s.

The Theft of Motor Cycles.

At Greenwich Police Court on Thursday four men, charged on remand with the theft of a Harley-Davidson and Douglas, were committed for trial at the Clerkenwell Sessions. One was a discharged soldier, and another was due to join up on June 1st.

For Wasting Petrol.

On May 16th a lady motorist at Watford left the engine of her car running for "one minute" while she went into a shop to make a small purchase. A police sergeant timed the absence of the offender as five minutes, with the result that the lady motorist was brought before the Bench. The Commissioner of Police had directed that the regulations be enforced at the present time in order to save petrol, but as this was the first offence in the district the defendant was ordered to pay costs only.

We do not suggest that the police were over zealous, yet daily we witness wastage of a much more serious nature. It is no uncommom thing to see a whole queue of military cars, from twelve to twenty in number, standing for twenty minutes or more in a certain thoroughfare, every car with its engine running. Similar cases of petrol wastage in the Army can be witnessed almost anywhere, and by looking out for this sort of thing the police might be much more usefully employed than by harassing private motorists, who can be thoroughly depended upon not to waste petrol in these days.

And Again——

Three military motor cyclists—so the story goes—were despatched by an officer to buy some watercress. These three able youths rode for two hours (evidently not in the Berkhamsted district) ere their quest was obtained, whereupon they bought threepenny worth of watercress. It can be taken that the purchase cost two gallons of petrol plus six hours of joy-riding.

Petrol Substitute.

We have received one or two enquiries with regard to "our" new petrol. We do not know to what these enquiries refer, and we are not in the happy position of possessing any "new" petrol. What little we have has been in stock some considerable time.

Ten Thousand American Motor Cyclists.

Our latest Ally will, as may be imagined, take full advantage of the motor cycle in equipping its army. Tenders have already been invited for five thousand solo mounts and five thousand sidecar combinations by the General Depot of Quartermaster Corps in Chicago. The tenders have to be in the Quartermaster's hands by Sunday next, and emphasis is laid upon ability to ship promptly. Our contemporary, *Motor Cycle Illustrated*, considers this announcement the most important ever made by the Federal Government in connection with its recognition of the motor cycle as a military adjunct.

Youthful D.R.'s Wanted.

The 1st Cadet Battalion, the Royal Fusiliers (City of London Regt.), is open for recruits from 14 to 17 years of age, and there are a few vacancies in the Motor Cycle Section for men who own motor cycles and are good riders. They are trained as despatch riders, and petrol is provided for such training. Intending recruits should apply to the Harben Armoury, Pond Street, N.W., any Friday evening between 8 and 9 o'clock, or by letter to Sgt. H. Hatfield, 88, Charlotte Street, Fitzroy Square, W.1, from whom further particulars can be obtained. This is the only cadet battalion in London with any despatch riders on the establishment.

The Anti-motoring Press.

We quote the following paragraph from an evening journal:

"THE DUSTLESS ROADS.

"People living on the Brighton and Portsmouth roads find that their gardens and the vegetation of their localities have been able to show in their true colours.

"They are prepared to say much that is laudatory of the Petrol Control Committee, for the restriction on petrol supply has accounted for a great decrease in the motor traffic on the roads and a consequent alleviation of the dust nuisance.

"One resident on the Portsmouth Road states that for the first time in some years he has been able to open his windows with comfort.

"Where a hundred motorists passed along in peace time, and even in the spring and early summer of 1916, there are only three or four now.

"Dogs and poultry, too, can walk along the roads with a security that causes much discussion among them."

For the information of those who do not know the Portsmouth Road, we may state that it is quite the most dustless road, even under the very worst conditions, which can be found in any part of the United Kingdom. We can imagine the joy some people must experience through their dogs and poultry being able to walk along the roads without let or hindrance.

Aeroplanes for Sale.

An exceptional opportunity is afforded those budding motor cyclists of a mechanical turn of mind to initiate themselves into the science of aeronautics. The Ministry of Munitions is advertising for sale 106 aeroplanes, less engines, with the exception of one.

A Present from the Huns.

One of the Zeppelins which came over East Anglia the other night dropped a petrol tank. This is not the only instance of the murderous Zeppelin giving the country a present, as we have received several sets of first-class aero engines and the fuel to run them with as well on previous occasions. We are hoping that the next time the Zepps come our way they will drop a big tankful on our tennis lawn!

Journalist Piracy in W.A.

Not content with reproducing without acknowledgment or permission one of *The Motor Cycle* heading designs, *The West Australian Motorist*—the official organ of the W.A. Motor Cycle Club—whilst claiming to be the pioneer, practical, and out-and-out recognised motor journal of the State, has reproduced *en extenso* an article on "Transmission Systems" from *The Motor Cycle* (which is politely acknowledged to be an English motor journal!), another on "The Post-war Motor Cycle," by Eric Williams, holder of the Junior T.T., also a further one, entitled "Starting on Acetylene." The two latter are not acknowledged in any form.

We have given instances of this piracy in the past, but we little thought that a journal in one of the British Dominions, and making such boasts, would descend to this sort of thing. Fortunately *The Motor Cycle* enjoys a large circulation in Western Australia, as in all other countries where motor cycles are used, and we know that our readers will prefer to read *The Motor Cycle* articles at their original source.

A £50 Lightweight for 6d.!

If you wish to share in the chance of obtaining a modern motor cycle for sixpence, see page 510 of this issue.

A Well-tested Model.

Mr. A. A. Scott, of two-stroke fame, informs us that the experimental model Scott Sociable we ourselves tested and reviewed has been in hard use all the winter over the abominable roads of the Bradford suburbs, answering the purpose of general business hack about this important munition centre. The machine has stood up unflinchingly to the gruelling, and the design offers every promise of permanency.

The Cycle and Motor Trades Benevolent Fund.

The monthly meeting of the Executive Committee was held at 154, Clerkenwell Road, on Thursday, May 31st. The Treasurer's report showed that the funds are in a perfectly satisfactory condition. The usual number of grants were made, London and Birmingham sharing the majority. Annual subscriptions to seven hospitals were renewed.

Dispensing with Metal Fittings.

A new Army Order provides for the temporary abolition of spur chains, metal buttons, and metal badges of rank on officers' uniforms. Until further notice, buttons of brown leather or composition may be worn on all uniform jackets and coats in substitution for metal buttons, and embroidered badges of rank in worsted embroidery may take the place of metal badges of rank in all cases where the latter are authorised to be worn. Spur straps may be substituted for spur chains. It is intended that the Order should apply only to new articles that may be provided in the future, when metal buttons and badges of rank may not be readily procurable. The wearing of drab linen collars as an alternative to collars of drab flannel is also permitted.

GATHERING OF MOTOR CYCLE VOLUNTEER SECTIONS AT BLACKPOOL.
Col. Smith and Major Rigby inspecting motor cyclists on the occasion of the gathering of Volunteers at Blackpool last Sunday. (See page 523.)

With Motor Cyclists Behind Europe's Trenches.

Second Part of an Interview granted by Capt. Louis Keene, M.M.G.S., to Mr. J. H. Donehue, Editor "Motor Cycle Illustrated," U.S.A.

(The First Part appeared in our Last Issue.)

CAPT. KEENE, in continuing the discussion, spoke of the motor cycle used in the early days of the war and the question in the minds of some British Army officials as to the most suitable type for the various branches.

"A few months of actual work with the fighting forces cleared the air," said Capt. Keene. "It quickly became evident that excessively high speed was not an essential of the despatch rider's machine, contrary to the preconceived idea, and that even the machine gun outfits could get along nicely with motors of moderate rating, 6 h.p. or 7 h.p., for example. In short, the emphasis was taken off speed and placed on dependability.

Very Little Speeding.

"Don't get the idea," warned the Captain, "that our motor cycle chaps merely crawl around with their mounts because their motors are of relatively low powers—nothing could be further from the truth. They get over the ground in truly amazing style, but they do it by constant plugging, by tireless application to the job given them, rather than by bursts of spectacular speed.

"As a matter of fact, motor cycle speeding is frowned upon by most officers, except in extreme cases, owing to the fact that the number of motor cycles already smashed by the British armies is rather startling. It is a better showing for an officer to keep his men alive and his motor cycles running than to set a break-neck pace for a short time and then call for new equipment.

"Another reason for the use of light or medium-weight machines in military despatch service is found in the ever-increasing tendency towards team work. This is not a war of individuals; it is a conflict of nations. Every man is made to realise that he is a valuable cog in a titanic machine, and that he is counted upon simply to do the work of that cog—that he is not expected to fly off at a tangent and give any special exhibition of individual heroism. Our motor cycle sections have their heroes, lots of them, but it is the steady, conservative, fearless plugging of the lads who do not get into the limelight that piles up results for the folks back at headquarters. Moderate speeds are most conducive to team work.

No Place for Heavyweights.

"In a day's riding a despatch carrier may be compelled to lift his machine off its side or pull it out of ditches or shell holes a dozen times or more, and it is perfectly clear that he would have to be a Samson to keep up that sort of thing with a motor cycle weighing upwards of 300 lb. The boys are usually pretty well 'blown out' after a hard day, even with their light machines, and you can rest assured that every pound of weight makes a difference to them.

"Not the least important advantage of the relatively light and low-powered machine," continued Capt. Keene, "is the opportunity it affords the rider to put his feet down and 'slog' along in mud when crossing a field, or when picking his way along a road that is crowded with troops or motor lorries. A great deal of that is done, and it saves motor cycles and the lives of many men. The slogan of the British motor cyclist with the armies is 'get through'—and it makes no difference to him how awkward and unusual his method of progress may be so long as he keeps his motor running and ultimately completes his job.

"As has already been pointed out, the chief menace to the Army motor cyclist behind the lines in France—and, I presume, behind the other fronts—is the motor lorry. Until you have had one of those monsters roar around a curve and approach you like a runaway house on wheels, you can have no conception of the peril in which it constantly places cyclists. The driver couldn't stop very quickly if he wanted to—and besides he doesn't want to. He has been trained to believe that the road belongs to him and his juggernaut, and he never loses sight of that idea.

"If there happens to be a squad of motor cyclists in his path—well, that's their look out. If they don't clear the way for him, there is a good chance that someone will be killed or injured; so the despatch rider must be able to get himself and his machine out of the way quickly. Sometimes he has to climb a bank and drag his mount with him; always he has to juggle his machine with lightning speed, and the lighter it is the more likely he is to get it out of the fracas intact."

"How do you keep your Army motor cycles in repair?" asked the writer.

"As a general rule, the rider is responsible for the condition of his mount," answered the British visitor, "but it goes without saying that we have many repair stations where machines are sent for overhauling. These stations are always crowded, owing to the severe usage given the motor cycles, and it is therefore necessary to have each rider make his own repairs and adjustments as far as possible.

Simplicity of Equipment.

"In that connection," continued the Captain, "it may be well to state that great emphasis has been placed upon simplicity in our motor cycle equipment. I have placed so much stress upon the machine of moderate power for despatch work that I may be charged with overlooking the excellent service of the heavier and more powerful motor cycles in the sidecar and machine gun branches, but it is not my intention to do that. The motor cycle of 6 h.p. or 7 h.p. has its place in war riding, and an important place at that. I have talked about the lighter machines at some length chiefly because you do not seem to have realised in this country the need for more than one type of military motor cycle. I venture to say that you will in time follow the example of your Allies with reference to Army motor cycle equipment.

"When we consider the machine gun combination and the sidecar in actual service we find that these types are more likely to be moved at speed than the despatch machines. Add to this the fact that they have a heavy additional load to pull, often over bad country, and their extra weight and power justify themselves at once.

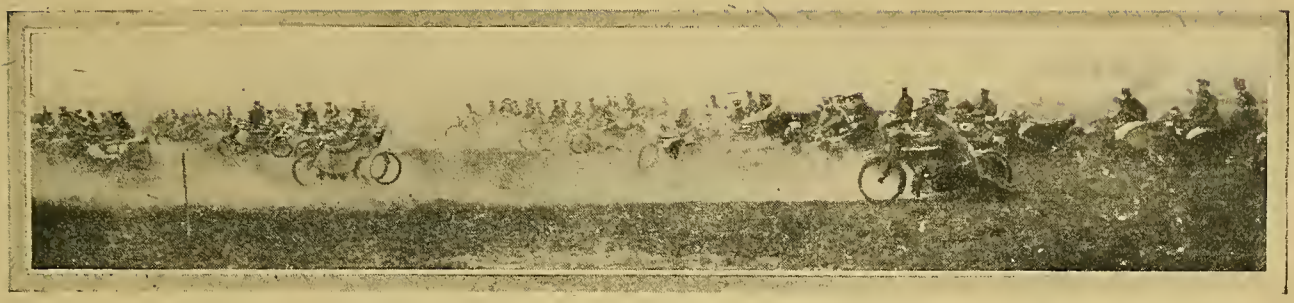
"I can hardly imagine a more inspiring, and at the same time more humorous, sight than a motor cycle machine gun combination swinging over a rough road wide open," said Capt. Keene, with a reminiscent smile. "The pilot keeps his saddle fairly well, doubled over the handle-bars and gripping his machine with his knees, after the manner of racers, but the gunner has a terrible time of it. All he can do is set his teeth and hang on. Half the time he is in the air, and the other half he is stopping a jolt with some portion of his tortured anatomy. If he survives a few such trips he is hardened for anything that may happen to him. Still, there is never a complaint.

Mudguarding.

"Mudguarding has for years past been given careful attention by the British manufacturers, and the war machines differ little in that respect from the stock models sold to regular riders for several seasons prior to the war. There is one point, however, that is worthy of note: Our machines have more clearance between mudguard and tyre than is allowed on American machines. We do not find that our boys do enough riding in heavy mud to clog their wheels, as was the case with your army motor cycles on the Mexican border, but even if the mud were sufficiently deep and gluey to act in that way it is probable that the additional clearance on our machines would obviate actual clogging. It is a feature worth thinking of at least.

"Let me say, in conclusion," remarked Capt. Keene, "that we have complete faith in America's ability to keep its motor cycle army units abreast of the times and on a par with the best that we have abroad—all that is needed is an awakening on the part of your industry to the fact that war is a hard and desperate matter, and that immediate attention must be given to the motor cycle problems developed at the fighting fronts. You will do the work when you undertake it, but you cannot do it without careful and systematic study of the requirements—and that study ought to begin to-day."

Capt. Keene has had several conferences with Maj-Gen. Leonard Wood and other American army officials, and has left nothing undone to impress them with the great importance of the motor cycle as a military factor.



Some of the men (representing 15 Volunteer Sections) starting from the parade ground for the saluting base on the Blackpool promenade. Note how the heavy rain is beating to the ground the smoke from the exhausts.

Motor Cyclist Volunteers at Blackpool.

Otherwise Successful Meeting marred by Rain.

A PIONEER in the motor cyclist volunteer movement, Lancashire has again led the way, and can claim the distinction of being the first shire in the country to organise a combined inspection of the various sections in the county.

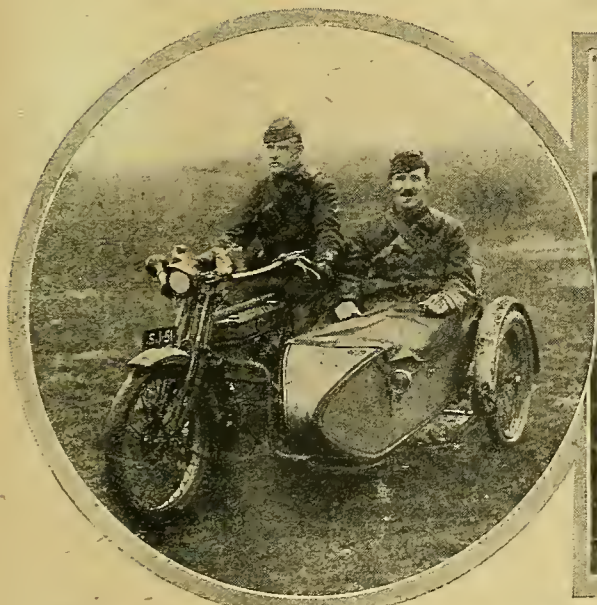
This interesting event, which took place at Blackpool on Sunday, was a big success so far as the turnout was concerned, but a dismal failure from the weather point of view. Lancashire motor cyclists are well aware that it *can* rain at Blackpool, but it was something of a record soaking they experienced this time.

The Muster.

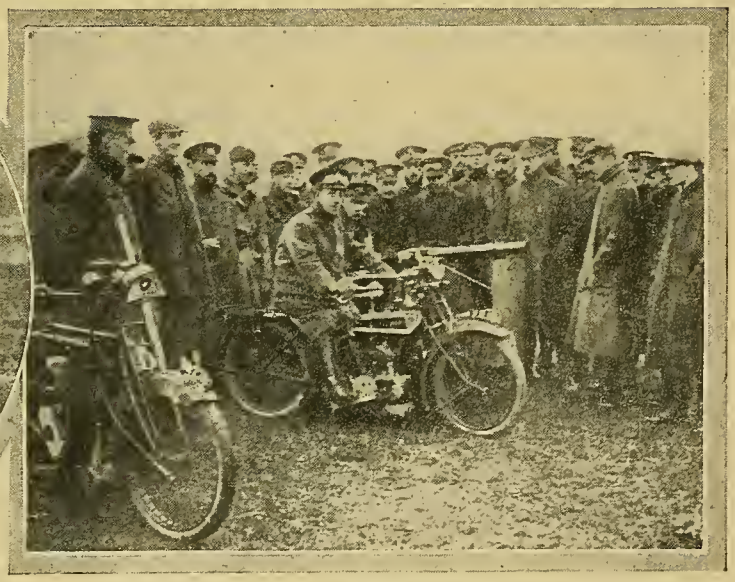
Over 200 motor cyclists participated in the "meet," fifteen sections being represented. The Liverpool area men had the biggest muster, the Heavy Car Battalion having forty, the Light Car Battalion twelve, and the Garston Squadron five men with machines and sidecar outfits on parade. Manchester came next with thirty, and Blackburn had twenty-six. Burnley and Bolton each mustered twenty, the other sections being: Preston, 12; Blackpool, 8; Southport, 5; Darwen, 5; and St. Anne's, 3. The Warrington section also put in an appearance. The Workington (Cumberland) section seized the opportunity of sending fifteen men with a view to learning something from their Lancashire colleagues. London, too, was represented—Sgt. Macready, the one time famous pedal cyclist, and Cpl. Watson, of the Motor Cyclists' Section, attached to the 2/1 London Volunteer Regiment, who, by permission of their C.O., journeyed to Blackpool at the invitation of O.C., S. W. Phillpott (Liverpool H.C.B.), the organiser of the inspection, who was officer for the day.

The sections paraded on the "Arras Trenches" field, Lytham Road, South Shore, and made quite an imposing array. Subsequently there was a ride past on Blackpool Promenade in the drenching rain, the salute being taken at the South Shore Hotel by the inspecting officer, Col. Smith, V.D., of Southport, the county commandant. Following upon a demonstration of signals and movements by a squad of the Liverpool H.C.B., M.C. Section, on the parade ground, Col. Smith carefully inspected the sections, and expressed himself highly satisfied. He especially congratulated the Liverpool men on their efficiency, and recommended all the sections to follow the rules for drill, movement, etc., drawn up by Mr. Phillpott, and printed in *The Motor Cycle* last week.

The most interesting turn-out was that of Sgt. T. Sharples, of the Blackpool section, who has mounted on a sidecar outfit a Lewis machine gun. He is the first volunteer motor cyclist in the country to have such an attachment.



Sgt. Macready and Cpl. Watson, of the 2/1 City of London Volunteer Regiment (Motor Section), who arrived from London to attend the gathering. They covered the distance of 234 miles in fourteen hours on a Vindec.



The sidecar machine gun outfit of the Blackpool Section attracts attention despite the rain. The gun is a Lewis mounted on Sgt. Sharples' A.J.S. sidecar.

COMBINATION DRIVE OR ALL CHAIN?

THE PROS AND CONS OF THE TWO SYSTEMS.

IT is rather refreshing to note that "Ixion's" views have of late become somewhat modified with regard to all chain drive, for it has many times occurred to the writer during recent years that this much appreciated contributor was rather given to spreading himself out when it came to dwelling upon the terrors of this type of transmission.

In the following it is not proposed to dash into unnecessary glorification of any one system of transmission, for the two under review each has its place. Each scores over the other on certain points and loses on certain other points, the belt drive being less suited to one type of machine and the chain drive less suited to another; but it must be borne in mind by those who have stuck to one system and appreciated its steady development that the other system, regarding which their recollections may not be of the brightest, has also developed proportionately. One often finds that a chain drive enthusiast condemns the belt drive on the strength of arguments founded on his experience of belt drives six years ago, ignoring the fact that belts, engines, and the whole layout of transmission design has entirely altered the state of things; and in the same way one finds the belt enthusiast denouncing the chain on the grounds of its alleged harshness, messiness, and liability towards disastrous breakage—overlooking the fact that a modern chain-driven machine is not harsh, does not break its chains, while messiness does not matter, since one merely oils it with a long spouted oilcan and then forgets all about it.

Largely a Matter of Taste.

The direct belt drive is, of course, off the boards, and, as "Ixion" has remarked, there is a well-defined limitation to the uses of the short belt drive —*i.e.*, chain-cum-belt. For lightweights it is undoubtedly more suitable than an all-chain drive, and for twin-cylinder mounts up to 3½ h.p. it leaves little to be desired. Regarding the latter, however, the torque is so smooth that a more positive system of transmission can be adopted, so eliminating the likelihood of transmission slip, and obtaining the advantages of absolute weatherproofness, etc.

For machines up to 3 h.p., then, the short belt drive is ideal; for solo machines between 3 h.p. and 4 h.p. it is really a matter of personal taste, which is largely governed by the nature of one's riding. For all-weather riding in a mountainous district the writer would certainly prefer the all-chain drive for a medium weight solo mount, whereas, if one's riding consisted chiefly of town work and flat country spins, the c.-c.-b. is perhaps preferable on account of its simplicity.

As regards 3½-4 h.p. single-cylinder solos, the writer would again prefer an all-chain transmission, on the lines of the Sunbeam or Enfield, on account of its mechanical efficiency, while as concerns sweetness or lack of sweetness there is practically nothing in it.

Forms of Belt Drive.

The long belt drive, Zenith system, is rather a different matter, and this system should be entirely suitable for high-powered solo mounts of any type.

Probably the root of the majority of the belt troubles experienced to-day is not in the transmission system at all, but in the slip-shod design of rear wheel mudguards. With almost any type of machine the c.-c.-b. drive is quite satisfactory in dry weather, but immediately wet going is encountered the fun begins. Another common cause of belt slip and excessive wear is over-lubrication of gear boxes, resulting in oily pulleys. When once the oil has got well home it is very difficult to remove entirely.

A Table of Comparisons.

The points in favour of and against the two systems are, therefore, as drawn up below:

Belt.	Chain.
(1.) Simplicity.	Reliability.
(2.) Susceptible to weather and road conditions, and cannot be totally enclosed.	Can be totally enclosed, but its reliability is not affected by road and weather conditions even if left open.
(3.) Always clean and accessible.	Inaccessible and messy.
(4.) Apt to slip when most desired to grip.	Always positive.
(5.) If adjusted to eliminate slip is apt to be harsh.	Most systems incorporate a shock absorber, which is always in operation and requires no attention.
(6.) Better adapted to lightweights.	Better adapted to heavyweights.
(7.) Spares: Complete belt.	A few links.
(8.) Breakage: No damage can ensue.	Very unlikely, but may entail accident and expense.
Attention required: Chain scores.	
Wear throughout: Belt scores.	
Cost of maintenance in favour of chain.	
Initial cost in favour of belt.	

All-chain drive is essentially an engineering job, whereas the step drive offers a simplicity of design much appreciated by the makers of built-up machines. A few reputable makers stick to it for preference, but it is often adopted as a back door method of overcoming difficulties of design, and gives trouble. No experienced rider would touch an all-chain drive except from a factory of repute.

CHINOOK.

IRISH ENTHUSIASM.

In her keenness to participate in National work, Miss Eliott Lynn rode her Harley-Davidson solo motor cycle from Holyhead to London—a distance of 260 miles, encountering rain and sleet on the Welsh mountains. She eventually became attached to the R.F.C. as despatch rider.

MY Irish friends laughed at me when they heard I was selling my Levis and was getting a Harley-Davidson to ride as a solo mount. They told me I would never be able to manage it, especially as it had no kick-starter and had to be pushed off. Nevertheless, it has never let me down yet, and I have ridden it in the thickest traffic as well as on rough country roads. They laughed at me a little more when they heard I was going to ride across England, and made sarcastic remarks about being in London in time for the next pantomimes!

I just took what I should want on the journey in a kitbag on my back, a tin of No. 2 Shell on the carrier, and started from Holyhead in glorious weather.

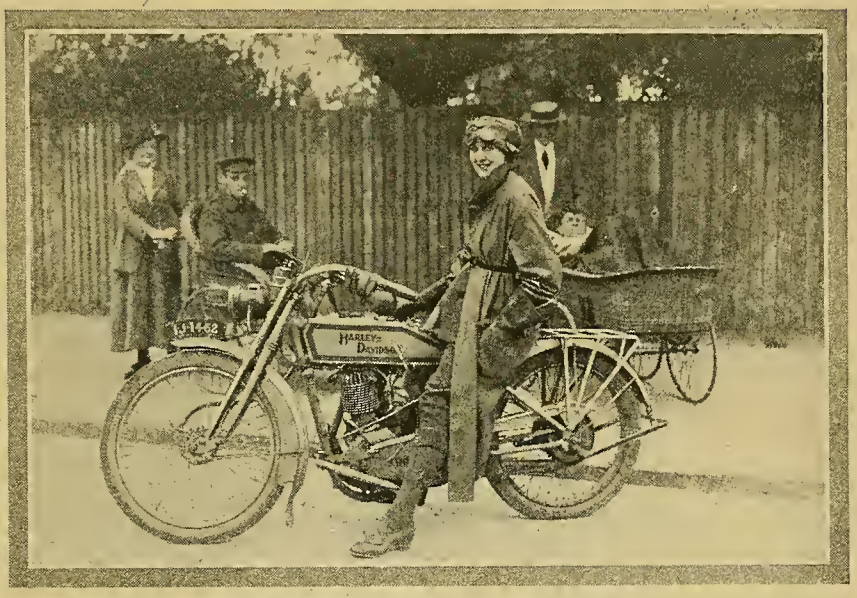
The sunshine left my way, however, in a desolate Welsh glen, where big hills come up on either side and the road creeps along their slope. It got bitterly cold, and the sleet was positively blinding.

The road was horribly greasy between Llangollen and Birmingham, but from the latter place to London was quite good.

Rather a delightful incident occurred *en route*. In a certain hamlet that shall be nameless stood a policeman—safely hidden by a corner—and, not wishing to be had up for making a mess of him, I declutched and jammed on the brake, but in vain, for, in an endeavour to avoid him, I slowly and softly glided into him, with the following embarrassing result. The man turned, viewed me up and down, and remarked, "Beg pardon, ma'am!"

I took about 11½ hours over the run; this, of course, does not include mealtimes. It would probably have been less if I had avoided Birmingham. I am now attached to the R.F.C. as a despatch rider.

SOPHIE C. ELIOTT LYNN.

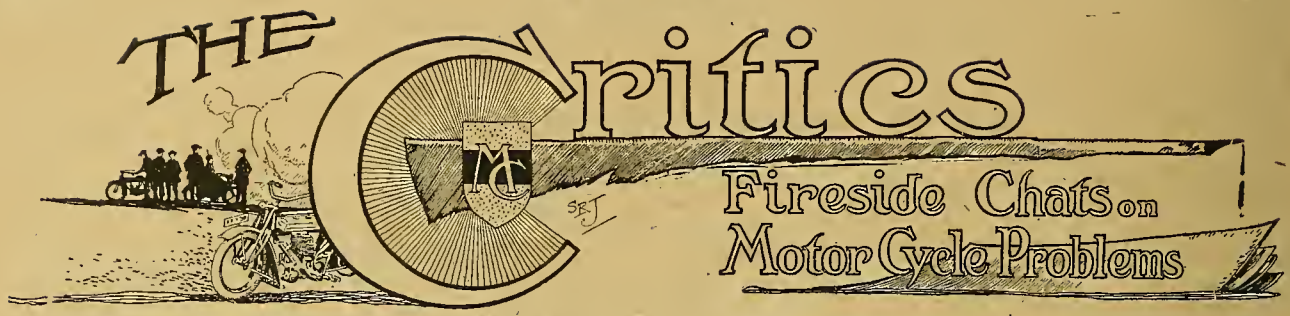


A DESPATCH RIDER IN THE R.F.C.

Miss Eliott Lynn prefers the comparatively heavy Harley-Davidson to the little two-stroke, even for solo work. Recently she rode from Holyhead to London in 11½ hours.

SIDECAR AMBULANCES.

Two extremely neat sidecar ambulances designed by Mr. George Campion, of the Campion Cycle Co., Ltd. These were purchased by the St. John Ambulance Brigade, and used with success at the Patriotic Fair held at Nottingham last week, when over "sixty" cases were conveyed either to their homes or to the General Hospital. The efficiency and handiness of the sidecar were well demonstrated.



NOISE OR SILENCE?

"I NOTICE," observed the Manufacturer, "that 'Ixion,' of *The Motor Cycle*—whose ideas have generally something in them when one comes to sift them down in practice—prefers a reasonably noisy machine to a silent one. In that he is, I am told, at variance with all the other writers on the same paper."

The Journalist sniffed. "There is no such thing as a *reasonably* noisy machine," he observed cynically. "Any machine that is noisy is *unreasonable*."

"Same here!" agreed the Novice. "When I was coming down from church last Sunday, amidst the top hats and lace petticoats ——"

"Were you wearing a top hat or a lace petticoat?" queried the D.R.

"The wife and I shared the honours. Well, an idiot with a girl on the carrier thundered through the church crowd on one of the noisiest machines I ever heard. That sort of thing doesn't do the cause of the motor cycle any good. You should have seen the look of disgust on some of the faces!"

"You mean," said the D.R., "that if he had sneaked silently by on a four-cylinder, no one would have thought any the worse of him for motor cycling and carrying a girl on his carrier on a Sunday, but since he rode an overhead valve single he was a cad!"

The Novice was no fool. "I mean," he argued, "that had he ridden a silent machine people might, if they were sufficiently narrow-minded, have criticised him, but they would *not* have condemned the whole pastime. As it was they naturally criticised the motor cycle into the bargain, and said, 'Beastly things!' The thought was in my own mind. I felt ashamed of owning one. That's where the harm was done—'beastly things!'"

The Journalist thought there was food for thought in the observations of the Novice. They were good. Such incidents undoubtedly had a very strong tendency towards making motor cycling unpopular. "Have you ever been in church on a peaceful Sunday evening when some thoughtless blighter starts up a noisy machine at the church gate?" asked the Journalist. "I have, and felt that I wanted to go out and kick him!"

A Public Nuisance.

The Manufacturer was wide-minded. "I do not blame a man for possessing a noisy motor cycle," he said. "It is probably an old one, and all he can afford. The man I blame is the young idiot who bores out his silencer, and who not only makes a public nuisance of himself, but who tends to make the machine he rides unpopular. I tell you, there are scores of them; and it would pay us manufacturers to buy their machines at list price if, by so doing, we could keep riders of this class off the road. Why do they do it? Purely for swank! Riding ordinarily, the extra 2 m.p.h. they gain makes no difference. One sees a twin lightweight making as much noise as an aeroplane as it dribbles along at 25 m.p.h. Then, if ever, one remarks, 'Silly ass!'"

"All of which is very sensible," decided the D.R. "But look here. You talk about consideration for the public. Well, the greatest consideration one can show the public is to avoid running into them. One pedestrian or cyclist run down does as much harm to the pastime as a thousand free exhausts; and if you *want* a mishap, your way to go about getting it is to ride a fast and silent machine."

"In other words," said the Journalist, "ride a noisy machine to save yourself blowing the horn."

The Danger Lies—

"Put it that way if you like," the D.R. agreed. "You cannot keep on blowing your horn every forty yards, unless you have an electric horn, with the 'bell push' on the saddle. Even then, on present-day roads, it would only ring once a fortnight! See here; have you ever ridden a fast and silent machine?"

"I should say so," drawled the Journalist, absently digging the point of his penknife into the polished mahogany table. "It is merely a matter of getting used to it."

The D.R. was thoughtful. "I do not agree," he said. "Take children or animals on the road. They do not judge the approach of a machine from sight—they judge it by more ominous signs. Kids will not stir till they actually *hear* a machine; then they scatter like rabbits. They will wake up a hundred yards away at the sound of a mechanical hooter but they will not move for an ordinary horn till you are within fifty yards. Ride a reasonably noisy machine, and the way is automatically cleared for you. Ride a silent machine on the same road, and it evolves itself into a series of hair-breadth escapes with chickens, puppies, and youngsters."

A Comparison.

A momentary silence followed. "What about cars?" queried the Journalist. "When a 40 h.p. car, capable of 70 m.p.h., can glide along in silence, and yet with perfect safety, why is it necessary that a motor cycle should be noisy?"

"Because people look out for cars," asserted the D.R., rather lamely.

"And so they would learn to look out for silent motor cycles, if they got half a chance. Children do not recognise a motor cycle as a source of possible danger unless they hear the usual din. They wait for it to give the recognised signal, but they would learn to judge the approach of the silent machine, just as we should learn to handle it."

The Manufacturer also had something to say. "Look here," he commanded. "If a silent car, which occupies three or four times the space of a motor cycle, can be driven in safety, what stands in the way of the silent motor cycle?"

"This," answered the D.R. "A motor cycle is not so conspicuous as a car. It does not appear so soon in rounding a corner, and it is capable of taking corners at a much higher rate of speed. Therefore, a man nipping about on a silent motor cycle needs to sound his horn much more frequently than if he drove a car."

Silence—the Coming Order.

"I think," ventured the Novice, "that the D.R. is getting into rather shallow water. The facts of the case are about as follow: A noisy machine is admittedly less pleasant to ride than a silent one. It is offensive to the general public, and entirely unnecessary. Before the war Government action was being taken to prohibit unnecessary noise. After the war this will undoubtedly come. The fastest and most efficient machines of to-day are remarkable for their efficient exhaust silencing. The motor cycle of the future will be silent, and the more silent it becomes the better for the pastime. Therefore, Mr. D. R., it is time you revised your ideas."

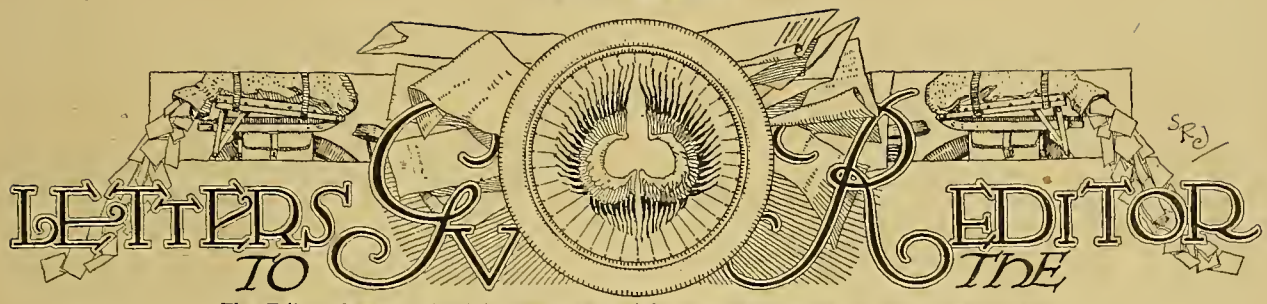
But the D.R. still held that safety and noise are inseparable. He did not realise the important fact that in these days noise no longer stands as the hallmark of efficiency, and that the noisy motor cycle is becoming a back number.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

BELT WEAR.

Sir,—I recently had a run of some 205 miles, during which I came across many miles of newly tar-sprayed and chipping-covered roads. On examining my belt, a practically new Dunlop, I found that the rubber on the sides was torn off in several places, which I think was caused by the chipping getting in the belt rim. I wonder if any of your readers have noticed anything of the same. A.J.B.

Widnes.

ERRATIC RUNNING OF 4¼ H.P. ENGINE.

Sir,—Reading the letter in *The Motor Cycle* of May 31st by Capt. Nias, Belfast, reminded me of an old machine of mine eight or nine years ago, which gave similar trouble. The trouble was caused by the float chamber of the carburetter being fitted in front of the jet, and a low petrol level being used. The consequence was that when descending a hill the engine was starved of petrol, and, of course, the steeper the hill, the worse the fault. I merely offer this suggestion, as the results in the two cases appear to be identical, although in an up-to-date machine the same cause ought to be impossible. JOHN SWAINE.

AIR PRESSURE IN TYRES.

Sir,—We Irish, unfortunately, do not see eye to eye in all things, even in tyre pressure; but those of us in the West Country, who try to play along on what can hardly be called roads, are indebted to Dr. O'Rafferty for opening up a subject which will not soon tire us (excuse pun). I am a cyclist of over thirty years, having served a sad novitiate on a 56in. wheel. I have been using pneumatic tyres since one of our conntrymen gave us this luxury. Before reading the last issue of your paper I imagined they should be blown up hard, and should like to hear what manufacturers have to say. I use my 3½ h.p. combination in all weathers, though most of the roads are rutty and covered with loose stones all the year round. In spite of this the treads last a long time; I have half a dozen treads with hardly a sign of wear, but gone on the walls and beads, in spite of hard blowing, sand paper, and paint to keep rust off the rims. If anyone could give me a remedy for this, or recommend a tyre with stronger beads and walls, it would be worth many years' subscription to the blue covered journal, so much valued by men away in Connaught.

I. C. BERESFORD.

TWO-STROKE PETROL CONSUMPTION.

Sir,—I read with much interest the letter by "L.C." in your Correspondence columns on the respective merits of two and four-strokes, but was amazed at his account of the enormous petrol consumption of the two-stroke, and I hasten to offer my experiences of a 2¼ h.p. New Hudson two-stroke. It is a single geared model, gear 5⅞ to 1, and has never yet run less than 100 m.p.g.

Recently I ran from Barrow to Blackburn, *viâ* Kirkby Lonsdale, Buckhaw, Brough, and Settle, a distance of about ninety-five miles, facing for the most part a fairly strong breeze. I returned on Whit-Monday, and my consumption worked out at between 130 and 140 m.p.g. for each journey.

No special tuning was given—or needed. The carburetter is a B. and B. two-stroke 28 jet, petrol level $\frac{3}{16}$in. below the top of the jet. The only alteration I made was that I removed the "anti-blowback" cap from the extra air inlet. This enabled me to run with the air lever seven-eighths open, though, of course, it was necessary to close it considerably on hills, as the enormous amount of extra air the engine was taking made it rather prone to knock—a feature which, I believe, is noticeable on a very well-known and very economical three-jet carburetter.

I find my New Hudson, with T.T. bars, a very comfortable little mount, delightful for cornering, and willing to climb till further orders. Its one disadvantage is that, as I stand rather over 6ft., the bicycle appears rather diminutive when I am riding it, and people wonder where I stow away my legs!

Lest anyone should think this an exceptional case, let me add that a friend on a single-geared Baby Levis used to run with me about the Lake District last year averaging 110 miles per gallon.

May I close with the usual disclaimer?

OSCAR E. HARVEY.

THE "SCARE" PRESS.

Sir,—In *The Motor Cycle* of May 31st you speak of the "scare press." We were starting off to Folkestone on Sunday morning (May 27th) to see friends of ours, when some motor cycle friends said, "The papers say all roads under military control," etc., especially the S.E. coast way. I was therefore careful to take my friend's letter saying we were expected. To our surprise, we never met a policeman (not even a "trap"). No one questioned us, and the garage people at Maidstone had heard nothing.

Some friends in Town were going to Margate, but decided not to on account of reports in the press. We arrived at Folkestone without the least trouble.

The roads are terrible in Folkestone. We expected our sidecar to break up at any minute. I am sure the roads could not be worse at the Front.

Folkestone looks like a Canadian town. The despatch riders are very fine drivers. We saw several on Indians who were writing down notes while going about 20 m.p.h. (hands off the handle-bars). I am sure they need their spring frames on those roads.

We returned home on Tuesday after a very interesting time, so you see it is not always wise to believe the "scare papers."

MINNIE TULLY.

SPARKING PLUG DESIGN.

Sir,—Just a few comments on "H.B.'s" letter on the four-point plug, in which the central electrode "was thick and split in four."

(1.) "H.B." avers that the resistance becomes greater as the temperature rises, thus causing the sparking to occur at the various points in rotation. Surely the elongation of the electrode would more than counterbalance the increased resistance, which would be negligible at so great a voltage.

(2.) The points never attain the same heat as a single point plug, so "H.B." has it This is hardly correct, for is not a greater heating surface offered to the ignited charge with a four-point plug? Which would become red hot the quicker if held in a Bunsen flame, the central electrode split into four and spread out, or the same metal solid?

(3.) Single point plugs "bridge" sooner than the four-point variety. Are not the chances of sooting quadrupled?

(4.) "H.B." states that the types with four points attached to the outside electrode suffer from the same defects as single point plugs. This surely is absurd, for is not the heat applied to these points dissipated throughout the cylinder, the points consequently being cooled more effectively than the central electrode? A. WARD.

PETROL AND THE DAILY PRESS.

Sir,—*Re* your paragraph in *The Motor Cycle* of May 24th, why should the careful and thrifty user of petrol have his small "savings" seized? If so, why not seize the money or anything else of every careful and thrifty subject? I have by careful adjustments and additions improved my petrol consumption on my 3½ h.p. Brough from 60 to 90 m.p.g. I consider it thrift and industry, as much so as if in money or food. R. R. LATHAM.

AIR PRESSURE IN TYRES.

Sir,—With regard to the discussion in *The Motor Cycle* concerning the air pressure in tyres, I would like to venture upon the following remarks. I have found that for all speed work hard tyres are absolutely necessary, and also for ordinary touring on bad roads, such as all roads are at present. But an old friend of mine in the trade, who had been a keen motor cyclist for years, always told me a fairly soft tyre would last longer, and I might venture to say that if you want an old cover to do its work it had better be left soft. For instance, when a tyre is old it is often put on the front wheel, where it is not required to be board hard.

(PTE.) L. WARD.

"SOME" BICYCLE.

Sir,—I have read "J.B.T.'s" letter, also your note *re* climbing capabilities of lightweights, and presume the remarks contained therein are meant for me, as being the first to make such claims.

It would be no benefit to me (or anyone) to make the statements I did in my previous letters if they were not true. I wrote in good faith, hoping someone would benefit by my experience. I have not mistaken Sunrising Hill, and, like "J.F." and Capt. Scott, I have climbed it on a Baby Levis geared 6—1, as well as on my Excelsior geared 5¼—1.

If "J.B.T." does not like "the buzzing and noisy two-stroke," I fail to see why he should air his views in the manner he did. He must remember that there are two kinds of two-strokes and riders.

I have never claimed 45 m.p.h. average. This would be too much for an 8 h.p. twin. I claim about 20-25. I am neither a novice nor an amateur. I have had over ten years' experience with all kinds of petrol-driven machines from 2 h.p. juniors to six-cylinder cars, so should know what I am talking about. EXCELSIOR.

King's Heath.

Sir,—Why are riders so anxious to climb a hill with a grade of 1 in 6 like Sunrising on top gear? The 6 to 1 direct gear of the Levis mentioned may enable it to get up, but it only proves that it is geared too low for the level and lesser hills. Any machine which will climb a hill like Sunrising, between Stratford-on-Avon and Banbury, on a single gear is geared too low for ordinary use. If it were provided with an indirect drive by countershaft and two-speed gear to give 6 to 1 on top gear, I do not suppose it would be so good at hill-climbing, even with a rush.

For goodness sake, do let us be a little practical; why so much argument about what machines will do on top gear and on single direct gears? We have change speed gears now, and any machines unprovided with a change speed are obsolete.

Fancy a motor car owner removing the gear box and lowering the ratio to 6 or 8 to 1 on top, then wobbling to Edge Hill to see if he could get up by tearing at it round a dangerous hairpin bend, with obvious risk to himself and other users of the road! L.C.

Birmingham.

TWO-STROKE DESIGN.

Sir,—I would like, through the medium of your correspondence columns, to reply to Sub.-Lt. C. J. M. Hamilton's letter describing a two-stroke engine of his own design.

I see that he decries the exhaust valve being placed in the cylinder head, as it "could not be made large enough and would not tend to make the plug any cooler," and advocates the inlet valve being placed in the cylinder head, although this necessitates a long transfer duct, which would be conducive to condensation of the gas and an incomplete fresh charge, as well as increasing the complication of cylinder casting.

I might draw attention to the fact that your correspondent contradicts himself on this point, as in No. 4 of advantages he says that "the casting for the cylinder would be simpler and lighter," while in No. 3 of the disadvantages he says "a slight additional complication in the cylinder casting."

I also notice that your correspondent still adheres to the utilising of the crank case as a pump, which has been proved to be, although simple and inexpensive, very inefficient.

I have designed—though up to the present, unfortunately, only on paper—a two-stroke engine suitable for a motor cycle of the horizontally opposed variety, both pistons working off one crank, which is the exact opposite of your correspondent's design, inasmuch as not only has it the exhaust valve situated in, and almost as big as, the cylinder head, the inlet being an automatic valve in the piston head, but it also obviates utilising the crank case as a pump. This is achieved by utilising the underside of the piston as a sealed base.

The advantages I claim for this engine are as follow:

(1.) Greater cooling and elimination of a hot side.
(2.) Direct and free passages for the gases.
(3.) A simple cylinder casting.
(4.) Elimination of a transfer duct.
(5.) Efficiency and accessibility.
(6.) Cheapness.

There are, of course, disadvantages, amongst them being the increased complication owing to the introduction of valves and also of the lubrication system. There are others which need not be enumerated here.

With all good luck to your excellent journal and my great appreciation of "The Critics." F. O. H. ABBATT.

[Our correspondent has read Lt. Hamilton's letter carelessly and quoted it wrongly. The contradiction referred to does not, in fact, exist, for advantage No. 4 is claimed to be "the casting for the *piston* would be simpler and lighter." —ED.]

THE POWER AND WEIGHT OF SIDECARS.

Sir,—Regarding the article by "Chinook" in your issue of May 31st, I cannot agree that the coming sidecar combination is the machine of medium weight and power. On every occasion I would vote for the heavy high-powered outfit. My present machine is as follows: A 1914 8 h.p. side valved J.A.P. engine, three-speed, chain drive, geared 4⅔, 7, and 12 to 1 (note the top gear); consumption, 55 to 60 m.p.g.; back tyre, 4,500-5,000 miles; front, 8,000. These tyre figures are the actual result of three years' special testing; total weight with passengers, 900 lb.; Millford underslung sidecar, coach-built. Its maximum speed is 55 m.p.h., and minimum slower than a walking pace. Its touring capabilities with two big cases on the luggage grid, camera, tools, etc., are representative of the last tour I made, viz., from London to the West Coast, viz., Frome, Taunton, Minehead, thence to Porlock, Lynton, and right down the coast to Land's End, and thence along the south coast to Exeter, Torquay, Sidmouth, Lyme Regis, and home *viâ* Dorchester and Salisbury, taking ten days, and not so much as looking at a tool. There were less than half a dozen hills which necessitated a change down, such hills as Dashwood being taken on top on the run.

Now as to a comparison with a 4 h.p. sidecar weighing 600-700 lb., where is the advantage with this type? Would such a machine complete the above trip faultlessly? It might with an expert driver, but by the ordinary man it cannot be done. I might add that there were four of this latter type accompanying us, all of the best makes, but three of these caused considerable delay, which was universally described to "tiredness." The fourth, which was in the hands of a thoroughly capable man, certainly performed wonderfully well, making a clean ascent of Porlock, and all but ascending Lynton Hill. Another high-powered make similar to my own, but made by different manufacturers, also completed the trip without any trouble at all. Hence, as a touring machine, the higher power outfit is clearly vindicated.

Can the medium weight show better figures on the tyre bill? I will admit that the petrol consumption would be better and the initial cost lower, but against this considerably more time must be devoted to "tuning," which is a big item.

Consequently, my contention is that a heavy weight high-powered outfit on which he can carry as much luggage as he may require, drive at any speed either fast or slow, and with a minimum of attention, is, in the hands of an average rider, far preferable to a machine upon which these advantages cannot be obtained. K.S.D.

Longhton.

THE FLAT TWIN IN THEORY AND PRACTICE.

Sir,—I am sorry to chip into a discussion so late, but the blame must be on the distance between Bagdad and Coventry.

I have been very greatly interested in the discussion under the heading of "The Flat Twin at the Bar" in *The Motor Cycle*, which I get fairly regularly out here, and I must say Mr. de Lissa is unfair to his excellent engine and its clever designer when he persists in carrying on a discussion of this kind. The V engine, like many other devices which are not quite correct mechanically, works very nicely in practice, and, above all, fits a bicycle frame to perfection. This, as far as I can make out, is its only advantage, and for this reason also it has been very largely adopted for motor cycles, and consequently greatly perfected. The flat twin, on the contrary, is an extremely awkward contrivance to fit into a cycle frame, and so, until quite recently, had only been used on very few motor cycles, and consequently received far less study than the V twin. But any engineer will see at once that the flat twin is a very sound mechanical proposition and that the V twin is not. As regards popularity, unfortunately the public taste is not governed by any theoretical principles. The 12 h.p. Lanchester engine, also a flat twin—and probably the best motor car engine ever designed before or since—was unpopular.

Mr. de Lissa's remarks about performance on the track and the road convey nothing to an engineer. If the A.B.C. engine were a hopeless failure—and I happen to know that it is exactly the reverse—this would not condemn the principle, but merely show that the principle was wrongly carried out.

Surely every motor cyclist in Great Britain knows that the M.A.G. is among the most successful motor cycle engines ever made, but to argue that the V principle is superior to the horizontally opposed is futile. The contrary is far too widely known.

If ever I get back home after the war I am going to buy a 3½ h.p. A.B.C. and take it for a long hard tour in France. If I can find a V twin enthusiast to accompany me and compare notes I shall certainly seize the opportunity. SIKH.

Mesopotamia.

PETROL COOLING.

Sir,—For two years I have been using a two-stroke motor cycle. During the past few months I have been mixing petrol with my oil, and have noticed great improvement in all respects. The liability common to all two-stroke motors to overheat has been reduced to vanishing point. Now I take hills on top with a passenger up, which would previously have required second riding solo. No necessity now arises for those rests to let the engine cool down after high-speed runs for some miles and before tackling a stiff climb. Power and speed have been greatly increased, and overheating done away with. These great changes I put down to one thing—oil cooling. The petrol entering the crank case with the oil evaporates there, thus cooling the oil and the working parts, including the internal surface of the piston.

In recent issues of your paper have appeared descriptions of various devices, ingenious and interesting, for effecting this cooling of the piston. All have been mechanical methods of allowing radiation, conduction, and convection to cause cooling. One of Nature's favourite ways of reducing heat is by evaporation. Why not take advantage of this? The power of this property of some liquids—notably petrol, which quickly changes its state at atmospheric pressure and temperature—to cause cooling is seen in many instances. Why is it that the first places on a motor bicycle in winter to become coated with ice are the carburetter and inlet pipe? Evaporation! When we ourselves perspire with heat after exercise it is so that evaporation may cool us. It is by the use of this property that we are enabled to eat meat and fruits which have been in refrigerators for weeks, having come from distant colonies, frozen during the passage. The evaporation of the petrol in my crank case effects this cooling. After it has been converted into a gas it is added to the main supply coming from the inlet pipe, and, passing on, is soon after exploded in the cylinder. As the oil is greatly thinned, I have been using C.C., which is, after the addition of petrol, of the consistency of T.T.

A minor gain is that now one would have no trouble from clogged up oil feed pipes. The quicker evaporation takes place the more efficient the cooling. In the crank case two conditions are present, both highly favourable to rapid change of state—namely, heat and reduced pressure during part of the cycle of motion. The possibilities of using this method of petrol cooling seem great. Might we do away with the separate petrol tank and float carburetter and use the crank case as a type of surface carburetter? By experiment, the limit of usefulness will be found.

In the two-stroke engine it is easily tested. Mix a portion of your petrol with the oil; the proportion will vary with the machine, oil used, and weather conditions. By using cooled oil as a lubricant less is required, and more efficient oiling is obtained. To apply this principle to the four-stroke variety of engine is, of course, a different proposition. Some mechanical arrangement is necessary to give escape to the gas formed in the crank case and a pipe to lead it to the inlet. M.B., R.N.

A CURIOUS MAGNETO FAILURE.

Sir,—A few days ago I had my first experience of real ignition trouble, and, although that trouble is now at an end, yet I do not know when it may appear again. Perhaps you or some of your readers might be able to help me to a satisfactory way of dealing with it.

Let me first of all state with all due modesty that I think I can safely claim to be a pretty good mechanic; secondly, I am not quite ignorant on the subject of electricity, having done the ordinary university course, which, though it teaches one much, does not actually teach one anything of the magneto as applied to motor cycles.

About two months ago, having some time to spare, I took down my magneto in order that I might clean the ball cages and repack with grease, the instrument being a U.H. and not fitted with lubricators, and the advice of the manufacturers being to repack with grease every 10,000 or 15,000 miles. Now mine had run 15,000 miles or more without giving any trouble. I never even had to true the points, and, there being no rocker or fibre bush to stick, I had no trouble with it. I found on taking it down that the points were almost perfect, there being only a very slight depression on one and a slight corresponding elevation on the other. This I corrected, and reassembled the magneto. All went well for about two months, when one day after about one and a half miles run the machine "ceased fire." Of course I did the usual thing, and at once traced the trouble to the ignition, and presently (so far as possible without a spare plug) to the magneto. I then carefully went over everything again, carburetter and engine, and found all correct, and once again ended up at the magneto. To make a long tale short, I eventually removed the magneto and took out the armature, but could see absolutely nothing wrong, and as this was a roadside repair I reassembled and fitted the magneto. To my surprise the machine started without any trouble, and has run satisfactorily ever since. The only thing I did was to clean what little grease there was off the fibre block of the contact breaker, though this could not have had any effect, and also to scrape clean the carbon brush which bears against the condenser, though the latter was quite clean except for the usual discolouration due to the contact with the brass.

Of course I should be satisfied when the machine is running, but I am not; I like to know why a thing happens, and I think I have enough brains and hands to set it right, but in this case we have a cure without a known disease, which is most unsatisfactory.

With regard to the magneto itself, I may say that this is the second U.H. I have used, the combined mileages of which would be about 30,000, and in all that distance I have nothing to complain of. I never touch the magneto (except to grease), as it never requires attention. Often I have found my plug electrodes burnt away until I had a gap of ⅛in., and on one occasion I purposely opened the gap to well over ⅛, almost 3/16, and yet got perfect firing. As a matter of fact, I never ride with a gap of less than 1/16; in fact, the machine will not start easily nor run well on a standard plug gap. I may say I have no interest in the U.H. magneto, which is, I understand, Austrian. I only wish it was British, or that some Britishers would copy it, especially the non-sticking contact breaker.

H. H. BROWNRIGG.

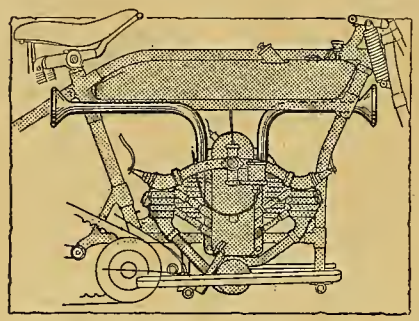
SUMMARY OF CORRESPONDENCE.

We continue to receive letters from our readers who have experienced excellent treatment from the makers of British magnetos, the latest being from owners of E.I.C. and C.A.V. magnetos.

IDEAS: Useful and Ingenious.

AIR-COOLING THE CRANK CASE.

AS shown in the accompanying diagram of a Douglas, a pipe about 1in. in diameter may be led under the tank and downwards to the bottom

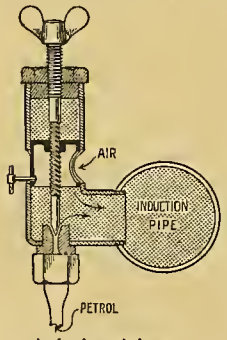


Cooling the crank case of a Douglas engine.

of the crank case, also a pipe from the crank case to the rear. The pipes being high up, the oil could not leak out. The ends of the pipe are funnel shaped, and covered with a fine gauze to prevent the ingress of dust.—R.E.C., Camberley.

A STARTING DEVICE.

THE accompanying sketch of an easy starting device, which controls both petrol and air, is practically self-explanatory. The petrol having been turned on at the tank the needle valve is unscrewed slightly by means of the milled nut. As the screw thread in the cap is a fine one, the needle is lifted very gradually, and raises the air slide with it, but the stem of the needle is provided with a quick pitch left-hand thread, which gives an extra and much larger lift to the air slide. Thus, the latter is lifted by means of both threads, and if these and the taper of the needle are properly proportioned a correct amount of air will be supplied with the petrol to give good combustion. When the engine has warmed up, the petrol can be turned off and the substitute supplied to the engine. The air slide can now be used to cool the engine, at the same time economise fuel when descending a hill.—W. EMERY, Gloucester.



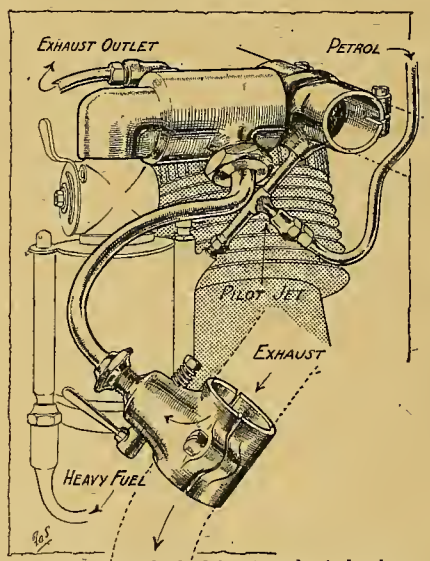
A device giving easy starting and improved running.

RUNNING AN INDIAN ON HEAVY FUEL.

FOR assisting the vaporisation of heavy fuels, the device shown, as fitted to a 1915 7-9 h.p. Indian three-speed model, is remarkable for excellent workmanship.

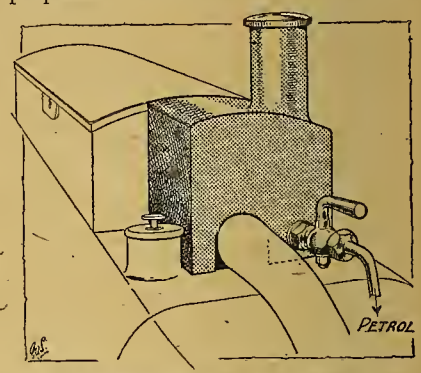
It consists of a muffle or jacket round the inlet pipe, through which is passed a portion of the exhaust gases, the amount of heat being regulated to a nicety by a butterfly valve in the connection which fits over a hole cut in the exhaust pipe. This part gives the heat necessary for vaporising the substitute, which is supplied through the carburetter in the ordinary way.

A pipe is led for starting from a small petrol tank into the pilot jet tube, which



A neat method of heating the induction pipe of a 1915 Indian to assist vaporisation of heavy fuels.

is a well-known feature of the Indian carburetter; the petrol sprays through a fine jet into the pilot tube, and thence into the induction pipe. The first explosions will be on petrol alone, and the engine is run in this manner for a few seconds. The substitute, being turned on, will then join in with the petrol through the ordinary pilot jet, and, the throttle being opened and petrol tap closed, the engine will continue running on heavy fuel alone. We are assured that the engine can be turned over to heavy fuel within a few yards of starting and without perceptible difference in the running. There is no need to finish a run on petrol, as is the case with many devices, because the petrol is led in front of the substitute for starting purposes.

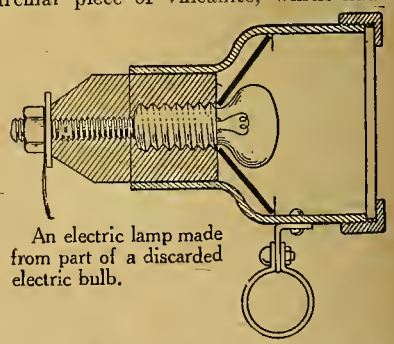


The small petrol tank is arranged to fit snugly on the top tube and matches the colour of the machine.

The petrol tank is fitted on the top tube behind the Indian tool box, and is enamelled red to match the machine. The fittings throughout are heavily plated, which considerably enhances the appearance.—T. BUSH, Coventry.

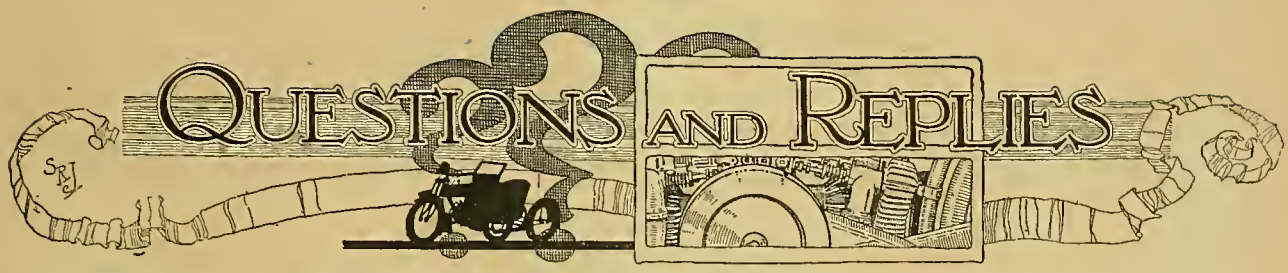
A SIMPLE ELECTRIC TAIL LAMP.

THE electric tail lamp illustrated herewith is made of an old electric lamp holder of the bayonet type. The centre was removed, and a miniature lamp holder from an old pocket lamp with the reflector was soldered at the back. The small nipple at the end of the lamp holder was then fitted with a circular piece of vulcanite, which had a



An electric lamp made from part of a discarded electric bulb.

$\frac{3}{16}$in. tapped hole through the centre, and carried a small $\frac{3}{16}$in. screw. This formed the one terminal. The other wire was fastened to the clip. The glass is held in position by a ring, which screws on the front of the lamp. The lamp is clipped to the carrier, and must be insulated by a small piece of insulating tape wound round the carrier below the clip.—ROBERT WILSON, Dunlop.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Voltage of a Magneto.

Could you let me know the approximate voltage of the spark from a magneto? Does it ever exceed 2,000 volts at, say, 2,000 r.p.m.?—E.H.S.

The voltage of a magneto under working conditions is subject to so many variations that it is no use trying to state definite figures. Approximately the working pressnre may be taken as 4,000 to 5,000 volts, the maximum given by the magneto being about 6,000 volts, after which point it will spark across the safety gap as usnally set. Some textbooks give 10,000 volts as the voltage of a magneto, but we cannot find any reliable evidence to support this, and we think it is wide of the mark.

Excessive Oil Consumption.

I have a 1913 model flat twin, and I find it necessary to give it what appears to be quite an abnormal amount of lubricating oil. Recently I travelled a distance of ninety-three miles. There was a head wind, and about one and threequarter pints of Motorine A did not prevent it from overheating at times. My speed rarely exceeded 25 m.p.h. On the return journey I nsed two pints of Mobiloil B.B. I travelled rather faster on this journey, but rarely opened ont my Binks carbnretter on to the second pilot jet. The engine did not overheat or show signs of excessive oiling either by smoke from silencer or sooted plugs. My petrol consumption was seven pints on the outward journey (93.2 miles), 106 m.p.g. On the return journey (90.2 miles), six and a quarter pints, 115 m.p.g. The engine is, to all intents and purposes, new, being fitted with new 1916 cylinders, pistons, and rings. Also new valves and springs, gudgeons, and small end brasses.—F.O.H.

There are many things which may cause excessive oil consumption, and since your engine is fitted with new pistons, etc., it is sure to require an abnormal amount of oil. That the engine does not smoke seems to indicate that oil does not get past the rings into the combustion head, and therefore it must be lost by friction or leakage. Make a careful search for leakage, and if the crank case joints appear to be letting oil throngh, this may be due to the crank case breather not working properly, or to the engine having been roughly assembled. Tighten up all joints, and if this fails to effect a remedy it would be worth while taking the engine down and remaking the joints with saccotine.

Belt Slip.

Although I have purchased a new belt for my 2¾ h.p. two-stroke, I am still tronbled with slipping, and should be very grateful for your advice.—R.A.S.

This trouble is generally due to the pulley being badly worn or incorrectly machined. Any competent repairer would be able to ascertain by means of gauges if this actnally is the case and to true the pulley up for you.

Chain Adjustment.

I have a 5 h.p. 1916 three-speed, American twin, and have not been accustomed to chain drive hitherto. (1.) How tightly should the chains be adjusted (front and rear)? (2.) When riding comparatively slowly on top gear the drive is extremely harsh and seems to jerk the engine unless the clntch is eased to a considerable extent. Is this due to the clutch or chains, and can it be remedied, as working the clutch pedal to a nicety on these rough roads is fairly tiring? (3.) The engine runs rather hot. Would thicker oil remedy this? I am using Prices' summer grade oil at present. (4.) When changing from the pilot jet to the main jet the engine jerks a little and fires only on one cylinder (rear) until raced and throttled down.—A.G.C.

(1.) The chain should be adjusted so that when the top and bottom runs of chain are depressed between the first finger and thumb the chain will deflect abont half to three-qnarters of an inch. (2.) This may be due to the engine firing unevenly, owing to a bad mixture at slow speeds, and it can be overcome by very slightly easing the clutch, so that it acts as a transmission shock absorber. (3.) The oil yon are using should be satisfactory; you need not tronble abont the engine becoming hot so long as it pulls well and does not knock. (4.) This is probably due to the wide difference in size of the two jets. Try experimenting with different sized jets. A larger pilot or a smaller main jet may cnre the defect.

In submitting to the Editor articles, photographs, or drawings, contributors are asked to mention whether the illustrations are exclusive, and further to enclose a stamped addressed envelope for return of unaccepted contributions.

Oiling Magneto.

I have an Ixion two-stroke fitted with a U.H. magneto. This magneto apparently does not require oiling, and I shall be obliged if you will kindly let me know whether it will be necessary to take it down for relubrication after so many miles?—T.S.

If the magneto is placed in a position whereby it will not become heated by the engine the packing of grease ronnd the main bearings will last an indefinite period, until the magneto requires a general overhauling.

Irregular Running.

My machine is a two-stroke lightweight, and when running at *less* than eight miles an honr the vibration is unbearable. It has just been returned from the makers after a thorough overhaul. It takes plenty of air and starts very easily, but for the first dozen or so yards it fires irregularly and jerks forward. A Sphinx plug, mark D41, is being used. I have tried another two-stroke plug without success.—L.A.B.

The period of vibration is evidently due to incorrect balance, but it is unlikely that you could get this altered under present conditions. Make snre the bolts holding the engine in the frame are tight. It is not at all uncommon for two-strokes to fire unevenly when first started aud at slow speeds. It is due to imperfect carburation, owing to the cold induction pipe and crank case.

Running on Paraffin.

(1.) I have a 2¾ h.p. Radco, and as I am unable to obtain petrol, I shonld like to run it on paraffin. I have coiled the pipe from the tank to the float chamber over the exhaust pipe and once round the cylinder between the fins. Will this warm the paraffin enongh to enable the engine to rnn? (2.) Will it be necessary to start on petrol? (3.) Shall I need a paraffin vaporiser? (4.) If I have to start with petrol, where is it best to make the connection to the carburetter from the anxiliary tank?—D.A.R.

(1.) This would warm the paraffin enough to allow the engine to run satisfactorily, but you will require also a hot air intake. (2.) You will have to start on petrol. (3.) You will not require a special vaporiser. (4.) The best plan will be to take the pipe from a small auxiliary tank to the plug under the jet, so that petrol is fed straight to the jet. You will then be able to start on petrol without draining the float chamber.

Wear in Hub Gear.

I have an Armstrong three-speed on my 3½ h.p. Triumph. The wheel has been fitted into the same stays as the free-engine wheel. It runs all right in the top gear, but in second and bottom the spindle turns round. Could you please tell me the cause of the trouble?—J.W.E.

Evidently the anchor plates on either side of the hub are badly worn. If you fit new ones your trouble will be remedied.

Refunding Licence Fee.

I have applied for repayment of my Inland Revenue tax on the strength of my being unable to obtain a renewal of my petrol licence, but have been informed that no repayment can be made. Will you kindly inform me whether this is in order?—H.H.

On the 5th March, 1917, Mr. Bonar Law announced in Parliament that he had decided to introduce a clause in the Finance Bill providing that where the owner of a private car (which covers motor cycle) is unable to use it owing to the restriction of the supply of motor spirit he shall, if he surrender his motor car licence before July 1st, be entitled to repayment of one-half of the duty which be paid on taking out the licence. Therefore the authorities to whom you applied are apparently in error.

Almost a Seizure.

When riding recently on my 3½ h.p. Triumph my engine suddenly lost power, and stopped after climbing a slight incline. After wheeling it a few yards with the exhaust valve lifted in order to restart, I dropped the lever; the back wheel at once skidded, while the belt slid round the pulley. On trying the engine on the stand with the pedals, I found it very stiff. After about one hour it became perfectly free. I have been told that this is due to the engine being on the point of complete seizure, due to want of oiling. Is this true? The engine is quite all right now, but I have doubts as to my hand-pump. After sending the petrol tank away for re-enamelling I have found that I do not feel the certain resistance in the pump when depressing it. Also, very little oil seems to be pumped at one stroke. This may be the cause of the whole trouble. I should be very grateful if you would give me your opinion on the matter. (1.) Was the engine really almost seized (it is quite free now)? (2.) Am I oiling too little owing to a bad pump, and if so, how am I to mend the pump and ensure the engine from further seizure? —H.M.

(1.) The engine was probably on the point of seizing, and you pulled up in time, with the result that it may have suffered no damage. (2.) It is quite possible, but you will have to investigate first by disconnecting the union, and then, if you find that oil is not being properly delivered, take the pump to pieces and investigate the cause. You may find that the washers want expanding, or they may require to be renewed.

Cleaning a Crank Case.

Will you kindly tell me the best way to clean my aluminium crank case?—H.H.

You can clean the crank case with petrol, petrol substitute, or any suitable spirit, using a very stiff brush on parts where the aluminium is badly stained with oil. The exterior of the case should first be thoroughly soaked with paraffin, and allowed to stand an hour or so.

Using Substitute.

(1.) Will you kindly say if petrol substitute can be used on a Harley-Davidson? (2.) Would the machine start up on it? (3.) How can I obtain a supply?—H.E.K.

(1.) Petrol substitute can be used perfectly successfully on a Harley-Davidson machine. We would advise you first to try a half-and-half mixture, finding out by experiment if the engine will take a still heavier fuel. (2.) No; petrol must be injected either into the cylinders or induction pipe, and it is best to run on petrol until the engine is warm, otherwise very imperfect vaporisation of the fuel will take place. Also you should fit a hot air intake, and convey the petrol pipe to the carburetter between the engine fins so as thoroughly to warm the fuel ere it reaches the carburetter. (3.) Substitute cannot now be legally bought unless it is entered on your permit in the same way as petrol.

Fitting New Bearings.

I should feel grateful for your advice on the following matter. On taking down the engine of a friend's machine to overhaul, I observed the bearings appeared very much worn, particularly the big end, and decidedly required renewing. Thinking that I had to deal with the usual phosphor-bronze bushes, I dismantled the crank case, and discovered that the bearings were of the roller type, consisting of phosphor or brass segments soldered to end pieces, and rollers then let into them when assembling. The solder had given way, and the whole contraption was in pieces when I examined it. The remedy, I presume, is to obtain new bearings from the makers or resolder existing ones. In either case there will still probably be too much loose play. As it is doubtful if I could obtain the necessary items from the makers in these extraordinary times, I am considering the making and fitting of the ordinary phosphor-bronze bushes to suit existing shafts. Do you see any objection to this, or can you suggest any means whereby the roller bearings may be retained without play? —M.J.D.

There is no objection to fitting plain bearings in place of the existing rollers, provided there is sufficient width to permit the use of plain bearings of proper area. As a rule, roller bearings are shorter than plain bearings. The present bearings might be improved by the fitting of new rollers, which should be easily obtainable, but, as a rule, the best plan is to replace a bearing of this type when it becomes slack. There is no other way of taking up slack except by getting new rollers.

READERS' REPLIES.

Magneto Troubles.

In *The Motor Cycle* of May 10th I notice one of your correspondents "H.S.H." is having trouble with his C.A.V. magneto, in that the contact breaker can be moved ⅛in. to $\frac{3}{16}$in. relatively to the sprocket. The cause of it is due to the end of the shaft being slack in the end of the armature just below the slip ring. The end of the shaft has two flats, and those fit into the end plate of the armature, the shaft then being riveted over. The end of the armature, together with the ball race and slip ring, must be removed, and the end of the shaft, which fits into the end plate of the armature, riveted up a little so that it is tight. I should not advise "H.S.H." to tackle this job himself unless he is a mechanic. He should either get a skilled man to do the job, or return the magneto to the C.A.V. works, as one has to be very careful when removing the ball race and slip ring.—Geo. A. Semple (Cpl.), A.S.C., M.T., B.E.F.

Iron Cement.

Regarding the part of "F.A.U.'s" query in your issue dated May 24th, which refers to filling up hole in a motor cycle cylinder, I can strongly recommend iron cement. I filled up a small hole in the cylinder wall itself with this cement, and, although the engine is rather on the small side, and so inclined to heat up pretty well, yet I have so far done 2,000 miles without the cement giving way. I would recommend "F.A.U." to get a tin of the iron cement powder, mix a little with water to the form of a paste, then add small pinches of the powder until the paste gets too thick to take more. Press this paste well into the hole to be filled, and leave to set for at least three clear days. I send this tip, as I myself have had so many useful tips from *The Motor Cycle*.—(Cpl.) S. C. Armond.

RECOMMENDED ROUTES.

Heywood to Oswestry.—C.W.

Heywood, Manchester, Altrincham, Northwich, Crab Tree Green, Tarporley, Whitchurch, Ellesmere, Oswestry.

Cardiff to Stockport.—W.G.

Cardiff, Newport, Usk, Monmouth, Hereford, Leominster, Ludlow, Craven Arms, Church Stretton, Shrewsbury, Wem, Whitchurch, Tarporley, Northwich, Altrincham, Stockport. Approximately 160 miles.

Ashby-de-la-Zouch to Crediton.—F.H.

Ashby-de-la-Zouch, Ibstock, Hinckley, Coventry, Warwick, Stratford-on-Avon, Weston-sub-Edge, Broadway, Winchcombe, Cheltenham, Stroud, Nailsworth, Bath, Wells, Glastonbury, Durston, Taunton, Sampford Peverill, Tiverton, Crediton.

Nottingham to Ponders End.—C.A.P.

Nottingham, Melton Mowbray, Oakham, Stamford, Wansford, Stilton, Norman Cross, Buckden, Eaton Socon, Biggleswade, Baldock, Stevenage, Welwyn, Hatfield, Barnet, New Barnet, Chase Side, Enfield, Ponders End. Approximately 135 miles.

Mechanically-scientifically-constructionally-and

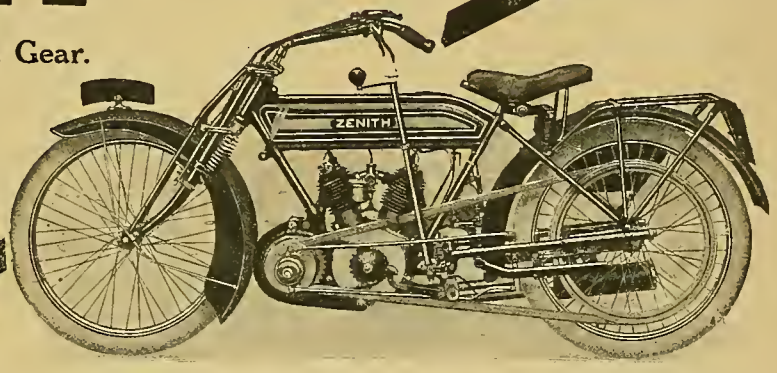
practically as perfect as a motor cycle can be, to-day, is the

ZENITH

with the Infinitely Variable Gradua Gear.

IF you have not closely investigated the points of this gearing—which gives you always, instantly, the correct gear ratio for every gradient, up or down—you cannot judge accurately. Ask others, yes, but learn also for yourself.

Write for details.



Owing to National circumstances it is impossible to deliver to private riders, but we can supply machines for National Service where the buyer's claim is recognised by the Ministry of Munitions and a permit granted.

Models from 3½ to 8 h.p.

Catalogue with pleasure.

ZENITH MOTORS, LTD., Hampton Court, England.

PLAYER'S

"COUNTRY LIFE" Cigarettes

(MEDIUM STRENGTH)

Pure Virginia Tobacco

Regimental Uniforms: Indian Army. Imperial Cadet Corps.

10 for 4½D.

50 for 1/10

These cigarettes are also supplied at Duty Free Rates for the purpose of gratuitous distribution to wounded Soldiers and Sailors in Hospital. Terms and particulars on application to—

JOHN PLAYER & SONS Nottingham.

Branch of the Imperial Tobacco Co. (of Great Britain and Ireland), Ltd

P.653

Bowden Wire Ltd.

BEING wholly engaged upon production for the British and Allied Governments, we are unable to execute any orders for private purposes until further notice. We have in stock certain goods suitable for replacements. Customers are invited to state their requirements in this respect, and, if possible, these will be met.

Established 1897.

London

Victoria Rd. Willesden Junction. N.W.10

Godbolds.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns first 12 words or less 1/6, and 3d. for every words after. Each paragraph is charged arately. Name and address must be counted. es discounts, conditions, and special terms regular trade advertisers will be quoted on lication.

ostal Orders sent in payment for advertments should be made payable to _____ & Co. FFE & SONS Ltd., and crossed _____

ll advertisements in this section should be ompanied with remittance, and be addressed he offices of "The Motor Cycle," Hertford et, Coventry. To ensure insertion letters uld be posted in time to reach the offices of ie Motor Cycle," Coventry, or London (20, or St., E.C.4), by the first post on Friday rning previous to the day of issue.

ll letters relating to advertisements should te the number which is printed at the end of h advertisement, and the date of the issue which it appeared.

he proprietors are not responsible for clerical printers' errors, although every care is taken avoid mistakes.

NUMBERED ADDRESSES.

or the convenience of advertisers, letters may be essed to numbers at "The Motor Cycle" Office. n this is desired, the sum of 6d. to defray the cost of tration and to cover postage on replies must be added ie advertisement charge. Only the number will appear he advertisement. All replies should be addressed o. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

ersons who hesitate to send money to unknown persons deal in perfect safety by availing themselves of our osit System. If the money be deposited with "The or Cycle," both parties are advised of this receipt. ie time allowed for a decision after receipt of the ls is three days, and if a sale is effected we remit the unt to the seller, but if not we return the amount ie depositor, and each party to the transaction pays age one way. For all transactions exceeding £10 in e, a deposit fee of 2s. 6d. is charged; when under the fee is 1s. All deposit matters are dealt with at entry, and cheques and money orders should be made able to Iliffe & Sons Limited.

ie letter "D" at the end of an advertisement is an cation that the advertiser is willing to avail himself of Deposit System. Other advertisers may be equally rous, but have not advised to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no wer to their enquiries are requested to regard the ice as an indication that the goods advertised have ady been disposed of. Advertisers often receive so y enquiries that it is quite impossible to reply to each hy post.

MOTOR CYCLES FOR SALE.

Abingdon.

BINGDON, 3½h.p. King Dick, 2-speed clutch, handle starter, Douglas sidecar, fully equipped, excellent dition; hargain, £28.—Small, 23, Church Rd., Erith, nt. [X0968

A.J.S.

916 A.J.S., 2¾h.p., 3 speeds, complete; £50.—Cross, Agent, Rotherham. [X0943

.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2306

.J.S. Combination, in exceptional condition, 6h.p. twin, fully equipped; £55.—Percy and Co., 337, ston Rd., London. [3564

h.p. 1916 A.J.S. Combination, absolutely like new, done 700 miles, spare wheel, and electric lamps iplete; £105.—Cross, Agent, Rotherham. [X0942

.J.S., 1913, 2-speed clutch, U.H. mag., B. and B. variable jet carburetter, Lucas lamps, horn, in perfect order; any trial; £30.—Jameson, Eastholme, Sleaford, Lincs. [X0963

.J.S., 1915, 3-speed, clutch, T.T. bars, P. and H. head lamps, generator, rear lamp, tools, sound es, machine perfect throughout; £43/10.—Advertiser, 5, Gt. Portland St., W.1. [2859

.J.S. Combination, 6h.p., 3 speeds, clutch, etc. (December, 1916), mileage about 1,000, in practically w condition; may be seen any day; £90, or best offer. 1, Ilchester Rd., Weymouth. [3446

A really good detachable plug

is of special value in these days of petrol substitutes, particularly for two-strokes which soil their plugs so quickly. The

FORWARD "D"

excels in the matter of easy detachability, and a point you should particularly note is that there is no loose packing used in its construction.

Ask for New List.

FORWARD MOTOR CO.,
35, Forward Works,
Summer Row, Birmingham

VEVO THREE SPOUT INJECTOR

Polished and Plated.

No. 74. Post Free, 3/3 Net.

For injecting Grease and Heavy Oil into Gear Cases, Hubs, etc. A most useful article for all speed merchants.

Thousands are being supplied to the Government.

Vevo Works, PARK LANE, BIRMINGHAM.

MOTOR CYCLES FOR SALE.

A.J.S.

4h.p. Twin A.J.S., with 15 gn. Mills-Fulford sidecar, Cowey, spare tank, and all accessories, spare tank, fitted for paraffin, new November, 1915, run 6,700 miles; £70.—Lewis, 62, Tweedy Rd., Bromley, Kent. [X0828

A.J.S. 6h.p. 1914 Combination, 3 speeds, kick starter, chain driven, detachable back wheel, lamps, horn, in good condition; seen and tried by appointment; best offer over £60.—Orchard, 57, Wilbury Av., Hove. [3460

4h.p. A.J.S. Combination, 3-speed, complete with lamps, horn, etc., disc wheels, T.T. bars, good condition; 70 gns., or part exchange 2¾h.p. Douglas or A.B.C.—Brown, Clifford House, Holmer St., Hereford. [X1035

A.J.S., 6h.p., late 1914, 3-speed, tyres only done 50 miles, Cowey speedometer, 5 gn. model Lucas horn, tools, 2 retreaded tyres not used; price 55 gns.; excellent condition.—Bailey, Maidens Green, Winkfield, Bracknell, Berks. [3143

Alldays.

ALLON, single speed, 1915, condition nearly new; £20.—78, Sedlescombe Rd., Fulham. [3309

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [X0796

ALLON, late 1916, splendid condition, ridden 300 miles; £30, no offers.—8, Marten Rd., Walthamstow. [3441

ALLDAYS Allon.—All models are in stock at Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [3239

1916 2½h.p. Allon, 2-stroke, unscratched, not done 800 miles; £26.—Claessens, 416, Richmond Rd., 1st Floor, Twickenham. [3288

ALLONS From Stock.—New 2-speed models, £42 each, cash; easy terms or exchange.—Wauchope's, 9, Shoe Lane, London. [3557

2¾h.p. Alldays Allon, 1916, tyres good, splendid hill-climber, runs on substitute; bargain, £25.—Waugh, Ardway, Surbiton. [3475

1917 Alldays Allons, 2-speed models; immediate delivery; deferred payments if desired.—Jones, Garage, Broadway, Muswell Hill, N.10. [3514

ALLDAYS Allon, 2-speed, £45/3; single speed, £38/14; 2-speed and clutch, £48/7/6; exchange or extended payments.—Service Co., 292, High Holborn, London. [3598

ALLON, 2-stroke, 2¾h.p.; cash £38/14; extended payments; deposit £7/14 and 12 equal monthly payments of £2/13.—Harrods Stores, Ltd., Brompton Rd., London, S.W. [3541

Ariel.

ARIEL, 3½h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [2562

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

1917 Ariel, 3½h.p., 3-speed countershaft, not been used; offers, or exchanges.—Read, 10, Bartholomew St., Ipswich. [3500

1917 Ariel in stock for immediate delivery; deferred payments if desired.—Jones, Garage, Broadway, Muswell Hill, N.10. [3515

IMMEDIATE Delivery of 1917 new 3½h.p. Ariels, 3-speed countershaft, free engine, and kick start models, £72, cash, easy terms, or exchange.—Wauchope's, 9, Shoe Lane, London. [3558

ARIEL, 5-6h.p., 1914, 3-speed countershaft, T.T. bars, Millford Empress sidecar, new footboards, 1917 rear wheel, separate tanks and carburetters for 25% petrol as fuel, Lucas accessories; any trial or examination; £50.—Lt. Ellis, R.E., Gosforth, or Gretna Green, N.B. [X0909

Auto-Wheels.

WALL Auto-Wheel, little used, perfect condition; £6/10.—290, High St., Stratford. [3320

GENUINE Wall Auto-Wheel, little used, complete, splendid condition and running order; £8/10.—Murray, 37a, Charles St., Hatton Garden, Holborn. [X1012

Bat.

BAT, 3½h.p., F.E., clutch, Bosch, B. and B., cane sidecar, tyres perfect; a genuine and rare bargain, £15; appointment.—96, Ashbourne Rd., Mitcham. [3508

1915 Bat-Jap, 6-8h.p., 3-speed countershaft, K.S., Binks, all accessories, bought new 1916, new condition, coachbuilt sidecar; nearest to £48.—Sergt. Gerard, Eastchurch, Kent. [3505

8h.p. Bat-Jap Combination, or sidecarrier, engine just returned from makers as new, also new fork, springs, etc., receipts shown; £50.—Hughes, Tanlan, Bettws-y-Coed, N. Wales. [X0967

Bradbury.

1912 Bradbury and wicker sidecar, 2 speeds; £24.—Cross, Jeweller, Rotherham. [X0945

1912 Bradbury, 4h.p., just overhauled and enamelled, good condition; £16.—Ferndale, Colin Deep Lane, Hendon. [X0861

1913 Clutch Model 4h.p. Bradbury, in good running order; £18/10.—Jones, Garage, Broadway, Muswell Hill, N.10. [3520

MOTOR CYCLES FOR SALE.

Bradbury.

BRADBURY Combination, 4h.p., N.S.U. gear, new tyres, Cowey, Klaxon; any examination; a snip, £35, or near.—331b, King St., Hammersmith. [X0864

1914 Bradbury, 4h.p., 2-speed countershaft, Bosch, B. and B., engine just thoroughly overhauled, and all worn parts renewed, two new tyres, lamps, and horn; £30.—Box 961, c/o *The Motor Cycle*. [X1032

Brough.

1915 Brough, 3½h.p., horizontal twin, 3-speed, h.b.c. clutch, perfect order throughout; £46; also side-car.—61, Sandy Lane, Coventry. [X1007

1916 3½h.p. Brough, open frame, Sturmey-Archer 3-speed gear and clutch, Lucas lamps and horn, and all accessories; £55.—Dan Guy, Weymouth. [3413

Brown.

3½h.p. Brown and sidecar, 2-speed N.S.U., all in good running order; £20.—Jones, Garage, Broadway, Muswell Hill, N.10. [3521

B.S.A.

B.S.A. New 1917 Model K in stock; £64.—Eagles and Co., High St., Acton, W.3. [X1002

COLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A., new 1917, model K, in stock.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0491

B.S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888

3½h.p. 2-speed B.S.A., complete with all accessories; £31/10; guaranteed.—Wauchope's, 9, Shoe Lane, London. [3559

1916 B.S.A., 3½h.p., T.T., splendid condition; bargain, £50, nearest; photo.—10, Devonport St., Commercial Rd., E.C. [3547

B.S.A., 1913, 3½h.p., 2-speed, free engine, excellent condition; bargain.—Apply, W. Lay, Hilliard Rd., Northwood, Middlesex. [3339

B.S.A. Combination, hood and screen, etc., 1915, 1917 cylinder; any trial; £50.—Joselin, Loxley, South Av., Stoke Park, Coventry. [X1018

4¼h.p. 1916 B.S.A., 3-speed Model, kick start; £50; fitted with new coachbuilt Canoelet sidecar; £60; guaranteed.—Wauchope's, 9, Shoe Lane, London. [3560

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529

1917 B.S.A.'s, Model H actually in stock for immediate delivery; deferred payments if desired: Canoelet B.S.A. sidecar for immediate delivery.—Jones, Garage, Broadway, Muswell Hill, N.10. [3516

Calthorpe

COLMORE Depots, Birmingham, Manchester and Liverpool, for Calthorpe motor cycles. [0799

1915 2¾h.p. Calthorpe, 2-stroke, beautiful machine, fine condition; 19 gns.—30, Talbot St., Burnley. [X0988

CALTHORPE-J.A.P., 2¾h.p., late 1915, splendid condition, Enfield 2 speeds; £22 for quick sale.—12, Dukes Rd., Euston Rd., N.W. [3311

CALTHORPE Combination, 1914, 4¼h.p., in good clean condition, and thoroughly overhauled; £37.—Sharp, 32, Corporation Rd., Carlisle. [X0996

2¾h.p. New Calthorpe-Jap 1917 Motor Cycles, immediate delivery, fitted with Enfield 2-speed gear; £39/18, cash, exchange, or easy terms arranged.—Wauchope's, 9, Shoe Lane, London. [3561

CALTHORPE-J.A.P., late 1915, 2¾h.p., Enfield 2-speed gear, lamps, accessories, just overhauled, excellent condition; owner Overseas; trial by appointment; £22.—Robertson, 124, York Rd., Southend. [3402

Chater-Peugeot.

CHATER-PEUGEOT, 2¾h.p., low, Sensspray, spare belt; £10. Cobbold, 16, Blenheim Rd., Walthamstow. [3291

Chater-Lea-Jap.

CHATER-LEA, J.A.P. engine, 6h.p., 3-speed gear, with sidecar; £25, cash, or extended payments.—Service Co., 292, High Holborn, London. [3608

8h.p. Chater-Lea Combination, coachbuilt sidecar, with 3-speed countershaft gears, J.A.P. engine, in good condition, £35; also Chater-Lea sidecar, coachbuilt, £5.—E. Brown, 28, Congress Rd., Bostall Estate, Abbey Wood, London, S.E.2. [3469

Clyno.

CLYNO, 6h.p., 3-speed countershaft, coach combination, detachable and spare wheels; £69/10.—Motor Exchange, Horton St., Halifax. [3356

CLYNO War Office Combinations for immediate delivery from Colmore Depot, Birmingham and Manchester; inclusive price with spare wheel, 100 gns. [0884

CLYNO Combination, 1914, 6h.p., 3-speed countershaft, 4 interchangeable wheels, electric lighting, speedometer, horn, luggage carrier, etc., complete outfit; £65.—Davies, 16, St. John's Villas, New Southgate, N.11. [3382

Connaught.

CONNAUGHT, 2¾h.p., 1915, 2 speeds; £35 cash, or extended payments.—Service Co., 292, High Holborn, London. [3613

The DRUID MARK II.

—here shewn—we have purposely enlarged to convey to "more-recent" riders the simple lineaments of this, the Fork which long since was awarded by "Experience" its natural place in the equipment of "the EFFICIENT machine."

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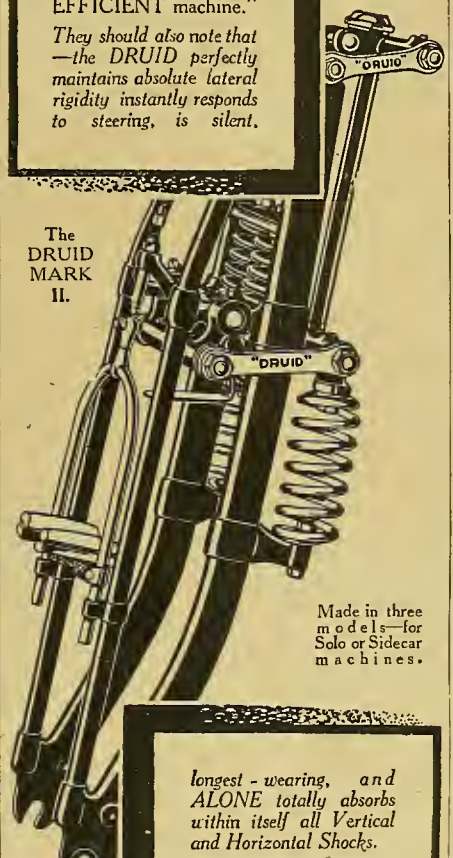

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Leopold Street,
BIRMINGHAM.

R.II 6

MOTOR CYCLES FOR SALE.

Connaught.

CONNAUGHT, 2-stroke, 1916, almost new, complete, lamps, horn, spare cover, belt, etc.; bargain, £25.—Box 948, c/o *The Motor Cycle*. [X0903

CONNAUGHT Miniature, single, £33/17/6; 2-speed £41/6/6; extended payments or exchanges.—Service Co., 292, High Holborn, London. [3597

CONNAUGHT, 2½-3h.p., 1917 Standard Model, Terry's spring links, heavy Dunlop studded tyre, perfect condition, under 300 miles; £30.—Hitch, 264, Hertford Rd., Waltham Cross. [3483

CONNAUGHT, 2¾h.p., 2-stroke, semi T.T. bars, recently overhauled and re-enamelled at cost of £8, condition as new throughout, with tools, accessories, and spare belt; a bargain, 22 gns., or offers.—Speed, Watergate, Whitchurch, Salop. [X0991

Coventry Eagle.

COVENTRY Eagle, 2-speed, 42 gns.; exchange or E.P.—Service Co., 292, High Holborn, London. [3596

COVENTRY Eagle 1916 Twin Sidecar Combination, 3-speed countershaft; £69/10, or Douglas and cash.—Holdsworth, 22, Belvoir Gardens, Halifax. [3355

COVENTRY Eagle (wonderful war bargain), 2¾-3h.p. Villiers engine, guaranteed perfect, done 600 miles only, 2 speeds, 2-stroke, take 2 anywhere; cost £47, accept £22, lowest, all accessories, etc.; appointment only.—Millard, Eiger House, Chesterfield. [X0974

COVENTRY Eagle, 2½h.p., 2-stroke, a very smart-looking machine; cash £37; extended payments; deposit £7/8 and 12 equal monthly payments of £2/10/7; also 2-speed model in stock, £44.—Harrods Stores, Ltd., Brompton Rd., London, S.W. [3537

Douglas.

DOUGLAS 4h.p. Combination, in nice condition; £55.

DOUGLAS'S, all models, 1911, 1912, 1913, 1914, 1915, and 1916; £13 to £50.—Percy and Co., 337, Euston Rd., London. [3573

1914 2¾h.p. T.T. Douglas, 2-speed; £30, no offers.—40, Station Rd., Barnes. [3512

DOUGLAS, 1914 model, 2-speed, good condition; £30.—Olliver and Addis, Margate. [3436

1911 Douglas, 2 speeds, shabby, but sound; £18.—Cross, Jeweller, Rotherham. [X0944

1917.—Gibb, Douglas Expert, Gloucester, for earliest deliveries of The Motor Cycle. [X8510

DOUGLAS, 2 speeds, 1915, been 1,000 miles; take £45.—65a, Rosendale Rd., Dulwich. [3457

DOUGLAS, 1914, 2¾h.p., 2-speed, lamps, horn, etc.; £34/10.—Motor Exchange, Horton St., Halifax. [3357

DOUGLAS, 1914, T.T., lamps, etc., guaranteed perfect; £30.—51, Maplethorpe Rd., Thornton Heath, S.E. [3471

DOUGLAS, 1913, 2-speed; £30 cash, or extended payments.—Service Co., 292, High Holborn, London. [3610

DOUGLAS, 1910, 2¾h.p., thoroughly overhauled, splendid condition; £13.—Box L3,755, c/o *The Motor Cycle*. [3329

DOUGLAS, late 1914, 2¾h.p., excellent condition, very fast; 35 gns.—Ross, 76, Gleneagle Rd., Streatham, S.W.16. [X0948

DOUGLAS, 1911, with lamps and tools; £18, cash or extended payments.—Service Co., 292, High Holborn, London. [3604

DOUGLAS, 1914, 2¾h.p. T.T. Model, 2 speeds, exceptional condition; £34/10.—Eagles and Co., High St., Acton, W.3. [X1000

DOUGLAS, 1913, 2¾h.p., very little used, engine as new, all accessories; £35.—Gerard Cobb, 8, Beverley Rd., Barnes. [3453

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855

COLMORE Depots, Birmingham, Manchester, and Liverpool and Leicester, for earliest delivery of Douglas motor cycles. [0800

DOUGLAS, 4h.p., and sidecar, kick starter and clutch; £60 cash, or extended payments.—Service Co., 292, High Holborn, London. [3618

DOUGLAS, 1914, with lamp, horn, speedometer, 2-speed; £42 cash, extended payments.—Service Co., 292, High Holborn, London. [3614

2¾h.p. Douglas, 1915 model, complete with lamps, horn, knee-grips, etc., splendid condition; £42/10.—Simister, Jordangate, Macclesfield. [X1021

DOUGLAS, 1916, War Office All-black Model W, 2 speeds, lamps, horn, spares, equal to new; £46.—Stratton, Mount Pleasant, Redditch. [3276

1911 2-speed 2¾h.p. Douglas, in very good order and condition; deferred payments if desired.—Jones, Garage, Broadway, Muswell Hill, N.10. [3517

1915 2¾h.p. Douglas U Model, 3-speed, footboards, upturned or semi T.T. bars, Dunlops, good condition; £45.—Robinson's Garage, Green St., Cambridge. [3397

DOUGLAS, 1915 Model, 2-speed, head lamp, generator, rear lamp, tools, condition of machine splendid throughout; £43.—Advertiser, 156, Gt. Portland St., W.1. [3096

MOTOR CYCLES FOR SALE.

Douglas.

1914 Douglas, 2¾h.p., 2-speed, disc wheels, long exhaust, good tyres, lamps, fast; owner Overseas; £30, no offers.—Munro, 310, Richmond Rd., E. Twickenham. [3376

1915 Douglas, 2¾h.p., 2-speed, Colonial model, lamps, horn, speedometer, etc., overhauled; £40.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0481

1914 2¾h.p. Douglas, 2 speeds, mechanical horn, speedometer, two new tyres, watch, etc., perfect; £30, no offers; petrol.—Cadet Stanley, A. Coy., No. 11, O.C.B., Pirbright, Surrey. [X0971

DOUGLAS, 1915, 2¾h.p., 2-speed, kick starter, lamps and horn, machine in tip-top order, £45; also 1914, T.T. bars, 2-speed model; £36/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green. [3236

DOUGLAS Motor Cycles for delivery within 7 days to doctors, farmers, or others that require them for work of National importance.—Eli Clark, The Pioneer Agent, Leader Depot, 223, Cheltenham Rd., Bristol. 'Phone: 4169. Wires: Ignition, Bristol. [X9692

2¾h.p. Douglas, brand new machines; we can deliver 24 immediately Models U, V, or W clutch, against priority permits; special facilities for doctors, farmers, and National workers.—Write for full particulars to the Douglas Specialists, Robinson's Garage, Green St., Cambridge. Tel.: 388. T.A.: Bicycles. [3462

DOUGLAS (Oct., 1914), 2-speed, as new, not ridden 2,000 miles, guaranteed perfect; any examination; Watford, extra heavy Bates back, Lucas set, thorough genuine lot, £37; also Zenith-Gradua, 1913, 6h.p., recently overhauled by makers, wicker sidecar, numerous spares, any trial, £40, or near offer.—Harris, 1, Parsonage St., Cubitt Town, E.14. Tel.: East 3946. [3477

2¾h.p. 1915 Douglas, Colonial Model V, 3-speed 24 motor cycle, in good condition, mileage 4,800, £3/3 Watford speedometer, F.R.S. De Luxe acetylene head lamps, F.R.S. rear lamp with Lucas generator, A.K. knee grips, and long mechanical horn, long exhaust pipe and cut-out, spare countershaft chain and 2 Lodge plugs, besides usual tools and accessories; cost £58, will sell £45.—Apply to A. W. Hatton-Ellis, The White Lodge, Melton, Suffolk. [X0923

Edmund.

YOU Simply Float on an Edmund.—Gourlay, The Great Douglas Agent, Fallowfield, Manchester. [8012

EDMUND-J.A.P., 2½h.p., 2 speeds, the wonderful spring frame machine. We can deliver from stock; price 50 gns.; detailed list free.—The North Wales Motor Exchange, Holt St., Wrexham. [X8755

Elswick.

ELSWICK-PRECISION Lightweight, 1915, 2 speeds, countershaft, little used, in new condition; £19.—27, Ormeley Rd., Balham. [3404

Enfield.

ENFIELD Combinations, latest models; £94/10; delivery from stock.—Below.

ENFIELD 3h.p. Twin; £57/10; and 2¼h.p. 2-stroke, £45; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter, and Tavistock Rd., Plymouth. [0838

COLMORE Depot, 31, Colmore Row, Birmingham, for immediate delivery of Enfields. [0801

ENFIELD Combination, 1912, £39/10, or exchange.—Motor Exchange, Horton St., Halifax. [3358

1916-17 Enfield 3h.p. Twin, ridden only 300 miles; £47/10.—Butler, 87, Station Rd., Redhill. [3499

ENFIELD, 1915, 3h.p. twin, lamp, 2 speeds, kick; bargain, £33, lowest.—Heath, 54, Crowndale Rd., N.W. [3474

ENFIELD, 3h.p., 1916, 2-speed, speedometer, done 500 miles; £45.—Apply to Hales, Garage, Newcastle-on-Tyne. [X0627

ENFIELD 1913 6h.p. Coachbuilt Combination, lamps, etc., just overhauled; £45.—40, Replingham, Southfields, S.W. [3486

3h.p. 1913 Royal Enfield, mag. engine, overhead tappets, 2-speed gear; £32/10.—Wauchope's, 9, Shoe Lane, London. [3548

RIDER TROWARD'S, 78, High St., Hampstead.—Enfield 1916 3h.p. twin, 43 gns.; 1915 ditto, 29 gns.; 1916 2-stroke, 29 gns. [3589

ROYAL Enfield, 1916-17, fitted with speedometer, 3h.p., £52/10 cash, or extended payments.—Service Co., 292, High Holborn, London. [3617

1914 3½h.p. Enfield, 2-speed, condition of machine and tyres as new, Lucas lamps and horn, all accessories; £32.—Dan Guy, Weymouth. [3415

ROYAL Enfield 6h.p. Sidecar Combination, practically new, with lamps, wind screen, and covers.—Apply, Permain, Lytham, Camberley, Surrey. [3336

ENFIELD, 1915, 2¼h.p., 2-stroke, 2 speeds, free engine clutch, fine condition, with accessories; £28/10.—Eagles and Co., High St., Acton, W.3. [X1001

ENFIELD Combination, late 1913, 6h.p., thoroughly overhauled and repainted, has not been used for 2 years; £37/10; any trial.—3, Carson Rd., W. Dulwich. [3447

ENFIELD 6h.p. Combination, purchased new August, 1916, mileage 1,500, equal to new, and guaranteed perfect throughout; 75 gns.—280, Camberwell Rd., S.E. [3411

TYRE BARGAINS

Special Clearance Lines.

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All goods sent on seven days' approval against remittance.

A 3/- outfit presented free of cost to all purchasers of goods as advertised on orders exceeding £1.

Please note, all goods must now be sent Carriage Paid; therefore, will Customers kindly include cost of carriage when sending remittance. Any excess will be refunded.

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	Our Price.	List Price.
CLINCHER:		
26×2 de Luxe	12/6	15/6
26×2 de Luxe, extra heavy	24/6	31/-
24×2¼ de Luxe, with Tube	19/-	32/-
26×2¼ A Won, rubber-studded	19/-	32/-
26×2¼ de Luxe heavy	20/-	32/-
26×2⅜ de Luxe, heavy	21/-	30/6
26×2½×2¼ Dreadnought	35/-	46/-
26×3 for 2½ rim, A Won, st'd'ed	21/-	38/-
KEMPSHALL:		
26×2¼ heavy anti-skid	21/-	32/-
26×2¼ heavy non-skid	30/-	45/-
26×2¼ heavy non-skid	38/-	48/-
BATES:		
26×2¼ No. 1 special heavy	28/6	44/-
26×2⅜ No. 1 special heavy	30/-	48/6
26×2½×2¼ No. 1 special heavy	32/6	49/6
26×2½ No. 1 special heavy	32/6	49/6
MICHELIN:		
26×2¼ heavy Trident	21/6	30/-
26×2½ heavy Trident, wired on	21/-	32/-
MOSELEY:		
700×80 Combination Oversize for 650×65 rim	55/-	75/-
PEDLEY:		
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26×2½×2¼ 3-ribbed extra hea'y	31/-	48/-
26×2½ 3-ribbed extra heavy	31/-	48/-
26×2½ for 650 rim, 3-ribbed extra heavy	33/6	50/6
26×3 for 650 rim, 3-ribbed extra heavy	34/-	72/6
28×3 3-ribbed extra heavy	38/-	67/6
WOOD-MILNE:		
26×2¼ Grip-ribbed heavy	20/-	33/6
26×2¼ Grip-ribbed extra heavy	23/6	46/-
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TUBES.—Continental, Elite, etc.

24×2	4/3	
26×2	4/6	6/9
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26×2½	6/9	8/3
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26×3	7/6	9/6
28×2¼	7/6	9/3
28×3	9/6	11/9
650×65	6/6	10/-

Butted, 1/6 extra.

BELTS.

CONTINENTAL—		
8ft. 6in.×⅞in. lengths only	7/-	13/9
Midland Patent Wire Core.	Per foot.	List Price.
⅞in. section	1/1	2/-
Best English Make.		
⅞in. section (7ft. lengths only)	1/-	1/5
1in. section (6ft. lengths)	1/3	1/11

ELITE RUBBER CO., LTD.,
266, Vauxhall Bridge Road,
VICTORIA, S.W.
'Phone—Victoria 6553.

MOTOR CYCLES FOR SALE.

Enfield.

ENFIELD 1917 Model 6h.p. Combination, with luggage grid on sidecar, tools and accessories, splendid running order; £90.—Duke, Clothier, Caterham Valley. [3286

ENFIELD Six Combination, tip-top turnout, everything in new condition; particulars, letters only; no dealers.—B.G., Polwarth, Park Hill, Clapham Park, London. [3312

1917 Enfield Combination, 6h.p., lamps, horn, disc wheel on sidecar, absolutely as new in every way; £90.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551

ENFIELD, 3h.p., 1914, 2-speed, new tyres and speedometer, head lamp, generator, rear lamp, tools, condition of machine perfect; bargain, £33.—Advertiser, 156, Gt. Portland St., W.1. [3273

1916 8h.p. Enfield Coachbuilt Combination, 3 lamps, horn, Dunhill triple screen, tyres excellent, full equipment of spares, 60 m.p.g., the whole turnout in new condition, guaranteed perfect; good reason for selling; 80 gns.—Capt. Kellar, 9 Camp, Bulford. [X0711

Fafnir.

FAFNIR, 3h.p., m.o.v., 2-speed, Bosch, Saxon, Amac, fast, climb Birdlip; £16.—2, Emerson Rd., Harborne. [X0951

F.N.

F.N., 2¾h.p., mag., spring forks, splendid condition; £12.—Haynes, Printer, Stamford. [X0821

F.N. Lightweight, not used since outbreak of war, everything in perfect condition; sacrifice £20.—Hunter, Ardsheal, Oban. [X0905

F.N., 4-cyl., 5-6h.p., 1912, Bosch mag., lamps, spares, fast, excellent condition; £17.—Morsley, 80, Grangehill Rd., Eltham, S.E.9. [3298

5-6h.p. F.N. and C.B. Sidecar, in good condition, fast and powerful; £24, or near offer.—40, Frodingham Rd., Scunthorpe, Lincs. [3280

2¼h.p. F.N., new condition, splendid mount, 2 speeds, shaft drive, all latest improvements; big snip, 19 gns.—30, Talbot St., Burnley. [X0987

F.N., 5-6h.p., 4-cyl., fast, Bosch, dropped top tube; £15; exchanges entertained.—East, Courtney Lodge, Sutton Courtney, Abingdon, Berks. [3295

Grandex.

RIDER TROWARD'S, 78, High St., Hampstead.—New 1917 T.T. Grandex-Precision, 4h.p.; 29 gns. [3591

Harley-Davidson.

HARLEY-DAVIDSON Combination, 1916, dynamo lighting, run 300 miles; £90.

HARLEY-DAVIDSON Combination, 1915, dynamo lighting, almost new; £65.—Percy and Co., 337, Euston Rd., London. [3562

HARLEY-DAVIDSONS.—We can give immediate delivery of the new 1917 models.—Below.

1915 Harley-Davidson, 7-9h.p., and Millford sidecar, lamps, etc.; £60.—Below.

1915 Harley-Davidson Combination, 7-9h.p., 3-speed, lamps, etc., in very good condition; £65.—Below.

1915 Harley-Davidson and Millford Sidecar, electric model, speedometer, just been overhauled; £68.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

HARLEY-DAVIDSON, 1915, all accessories, electrical model; £70 cash, or extended payments.—Service Co., 292, High Holborn, London. [3615

HARLEY-DAVIDSONS.—Immediate delivery, new 1917 magneto models, with or without sidecars; exchanges.—Colmore Depots, 211, Deansgate, Manchester, and 31, Renshaw St., Liverpool. [0885

HARLEY-DAVIDSON, 1915, 7-9h.p., 3 speeds, clutch, electrically equipped, in splendid condition, as new; £55, no offers.—Smith, 96, Upper Richmond Rd., Putney, S.W. 'Phone: 1766 Putney. [3593

WANTED Offers, must sell.—1915¾ 7-9h.p. Harley-Davidson, dynamo lighting, 3 speeds, sidecar just left coachbuilders, perfect condition; called up; any trial here.—17, Calverley Rd., Tunbridge Wells. [3292

HARLEY-DAVIDSON, 1915, 7-9h.p., 11J Electric Model, and Swan sidecar, Stewart speedometer, and all accessories, low mileage, all in splendid condition; price £60.—A.B., 39, Westbourne Terrace, North Paddington. 'Phone: 3418 Padd. [X0984

1916 7-9h.p. Harley-Davidson Combination, Bosch mag. model, been 2,000 miles, Autochipse head lamp, all electric from two accumulators, spare tyre, apron, and chain; any examination or trial; £75.—Curtis, 60, Seven Sisters Rd., N.7. [3293

RIDER TROWARD and Co., 78, High St., Hampstead.—1915 sporting T.T. Harley, 7-9h.p., 3 speeds, clutch, kick start, mag. ignition, separate electric lighting, very fast, 56 gns.; 1915 Harley, 7-9h.p., 3-speed, coach sidecar, 63 gns.; another ditto, new 1916, Mills-Fulford sidecar, run under 2,000 miles, as new, 68 gns.; 1916 Harley coach sidecar, 20 gn. model, as new, 12 gns. [3577

HARLEY-DAVIDSON Electric Model, with their best sidecar, £126/10; Harley-Davidson, not electrically equipped, with their second best sidecar, £115/10; and the plain model with T.T. handle-bars and Swan cigar sidecar, £117/10; solo mounts £93 and £102; actually in stock; deferred payments by arrangements; demonstrations with pleasure.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [3233

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ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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Frame Design.

THE subject of frame design has been discussed in our correspondence columns on several occasions within the last month or so, especially with reference to the straight top tube. It is certainly rather curious that many makers who favour straight tube construction and make something of a talking point of the straight top tube, should apparently be quite oblivious of several other tubes, which might also be straightened with equal or even greater advantage. The rear triangle of the frame, for instance, is often built up of tubes which contain semi-circular kinks to accommodate the belt rim. Such a construction has far less to justify it than the dropped top tube, which was adopted to give a low saddle position without interfering with the tank space, and in the opinion of many has the advantage of the straight tube in the matter of appearance.

Appearance can hardly be said to enter into the question of curved rear stays, since they occupy an inconspicuous position, and the curves are not readily noticed from the side or when the machine is in motion. Moreover, it would be a perfectly simple matter so to design the machine that the width of the lugs and axle would give all the clearance necessary without bending the tubes at all. This would also enable wider mudguards to be fitted—another desirable point.

In the opinion of many—and their views seem to be sound—the frame of a motor cycle, though built with an engine for its centre, should be a rigid structure (this has no reference to spring frames), or in other words the strains imposed upon the frame should not have to be met by the aluminium crank case. This brings us to the loop frame, which must, of necessity, be made with a curved tube; but, as one of our contributors once said, a curved tube is better than none at all, and the curved part of a loop frame does not take the place of a tube which might conceivably be straight but supplies an extra tube where one does not exist in the more usual type of frame.

Closely allied to frame design is the question of mudguarding, upon which we have many times touched in these pages, but all we wish to say about this at present is that both mudguards and splashguards should be taken into account by the frame designer when his plans are laid out and not added, as an afterthought, or left to the ingenuity of the purchaser.

Possible Petrol Economies.

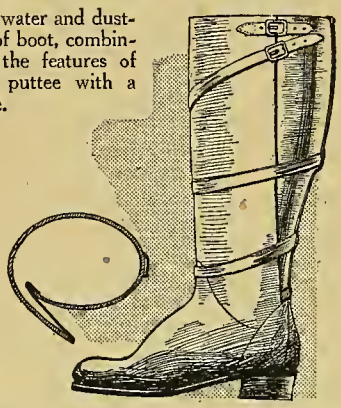
AGAIN we revert to the subject of petrol, in view of the position in which motor cyclists find themselves. The amateur gibberish which has been circulated by the sensational press on the subject of the scarcity of petrol encourages one to suggest to the authorities where some petrol economies could be effected. We mentioned one important instance last summer, viz., the strings of empty lorries which undertake long-distance journeys *unladen;* another is to stop the petrol issued to people who hire out cars to obvious joy-riders "by the hour, half-day, day, or week," as the advertisements run; there are, too, the hundreds of Sunday excursions into the country by heavy motor 'bus; the new business vehicles still arriving *from Overseas* which cannot be regarded as essential, since they have not been put into service; the daily use of petrol by managers and staffs of controlled establishments; the conveyance of furniture removals by motor 'bus from one end of England to the other, as the names emblazoned on the motor pantechnicons prove to be not unusual. These are but a few possible economies which occur to us as we write, we doubt not that there are many others, but who is to blame?—*certainly not the motorist.* Why, many motor cyclists have recently been *offered* petrol by the Petrol Control Committee, and some nearly collapsed at the news! What about the French allowance of ten litres (2.2 gallons) per day?

An index to the advertisements in this issue will be found on the page facing the back cover.

IDEAS: Useful and Ingenious.

A MOTOR CYCLING BOOT.

THE riding boot illustrated herewith is the invention of M. Larson, of Chicago, the idea being to combine the puttee legging with an ordinary boot



A water and dust-proof boot, combining the features of the puttee with a shoe.

in such a manner as to make a high boot which shall be both dust and waterproof. Another advantage is that the boot can be quickly put on and removed.

A PETROL GAUGE.

A HOME-MADE petrol gauge for a motor cycle tank may easily be made if the instructions given below are followed.

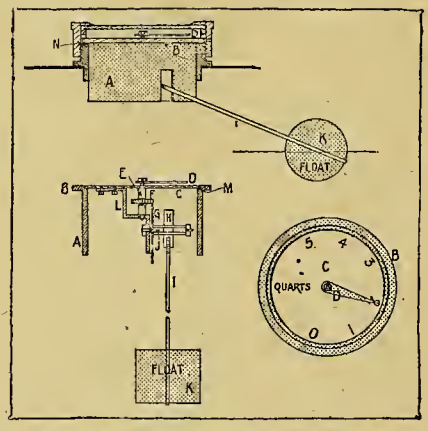
The body A is made of thick brass tube, turned to fit the filler cap opening of the tank, without shake, and recessed to take the dial C, which, in this case, is made of phosphor-bronze $\frac{1}{16}$in. thick. The flange B is pinned and sweated to the body, and the dial is also sweated in. A key N, fixed under the flange, fits a key-way filed in the screwed spigot, and prevents the apparatus turning round. The movement is supported by a piece of sheet brass $\frac{3}{8}$in. wide × $\frac{1}{16}$in. thick, bent as shown by L, and screwed to the underside of the dial by two $\frac{3}{32}$in. screws. This carries the spindle E for needle D, and spindle J. The cog wheels F and G are from an old clock, and are roughly 4 to 1. G is the hour hand wheel, and was already mounted on the tube, which runs on J. H is a brass disc about $\frac{1}{2}$in. × $\frac{1}{4}$in. thick, and into this (which is sweated to wheel G) is screwed a float rod I of $\frac{1}{16}$in. steel wire. Float K is of very thin brass sheet, soldered together, and soldered to I. A vent hole is drilled through the flange B at point M, and communicates with the vent hole in the cap through the annular space round the flange.

The instrument was graduated by emptying the tank and then filling up from a quart measure, putting the gauge in at each quart, and marking the dial in pencil; finally stamping on the figures.

The gauge has proved a great convenience, and although the needle sways about while running it gives a very fair idea of the fuel remaining in the tank. Of course, when the machine is at rest the reading is quite accurate.

Needless to say, a glass-topped filler cap is necessary.

In these days of petrol scarcity, one advantage is that, provided the body of the gauge is a good fit in the tank opening, it prevents the fuel splashing out of the vent hole even when the tank is full.

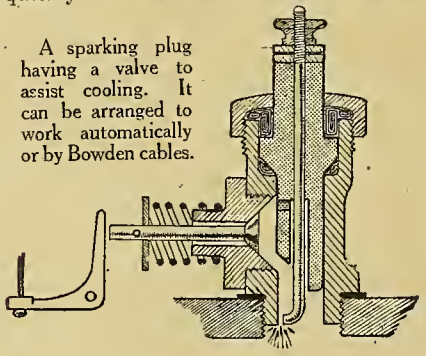


A petrol gauge which can be easily made from scrap material.

The gauge was made in two or three evenings, and entirely out of scrap material. — A. SHARVELL CULLWICK, Wolverhampton.

SPARKING PLUG & COOLING ARRANGEMENT.

THE sketch shows a sparking plug which differs from air-cooled designs which have been already published. The air escape arrangement is on the earthed side of the plug, and consequently can be hand-operated without danger of shock. It can also be used for the compression release of a two-stroke engine. In fact, it was first designed for the purposes of providing an easy means of clearing obstructions and the sooting up of a two-stroke plug whilst running. On a down gradient or on level at speed with throttle closed, the plug can be cooled and the cylinder scavenged with cold air, at the same time clearing the spark gap.



A sparking plug having a valve to assist cooling. It can be arranged to work automatically or by Bowden cables.

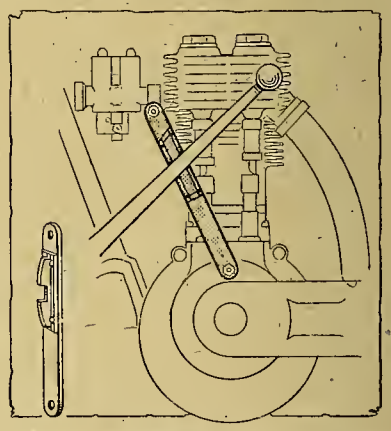
In the case of a four-stroke engine, the arrangement can be automatic, the air valve opening on suction stroke, or the lift of the air valve can be varied from the handle-bar, making an adjustable extra air valve, any air admitted tending, of course, to clear the spark gap and cool the plug.

On four-strokes, especially small engines, the plug can be used for starting and stopping in the same way as with the exhaust valve lifter, or as in a two-stroke.

The arrangement is protected.—"ENGRO," Baildon, Yorks.

A GEAR LEVER TIP.

WHEN the plunger lever on the quadrant of a Sturmey-Archer countershaft gear wears after long use the second gear is apt to slip out of engagement. It is, however, quite



A gate for middle gear of Sturmey-Archer countershaft gear.

a simple job to fit a gate, as shown in the sketch, to prevent this trouble. The sketch explains itself. An occasional spot of oil will prevent wear of the original part.—S. RAYNES, Sydenham.

Readers of "The Motor Cycle" are invited to contribute to this page any ideas successfully adapted to their motor cycles. Rough sketches will suffice.

Occasional Comments by "Ixion"

Cylinder Distortion.

EVERYBODY who has ever studied engine tuning at all closely knows that one of the main essentials is a piston which possesses the correct clearance when cool, and which will not distort when hot. These points are fairly easy to test, as a cast iron piston which takes a false set when it is hot usually cools more or less false, and reveals its distortion when callipered the next day. Now motor cycle cylinders are usually made of the very metal which has been the medium of so much piston distortion, namely, cast iron; and it occurs to one that if the piston is apt to distort. the cylinder is hardly likely to be immune, and if the piston retains its false set when cool, probably the cylinder is equally guilty. The cylinder distortion, if it occurs, will be most pronounced in the combustion chamber, where calliper tests are impracticable, and they will probably be exaggerated by the bulk of the metal accumulated there, and by the irregularity of its masses. If there is anything in this reasoning we stand in need either of cylinders which cannot distort, or of cylinders which can be retrued after the initial distortion has been found to exist, and if we can obtain these desiderata we shall possess engines which will be more efficient.

A Variety of Methods.

THERE are, of course, several methods of ensuring a true cylinder. The top of the bore will not suffer very much, as it is covered when the heat of the explosion is fiercest; the real problem must centre round the cylinder head, wherein distortion will affect the valve fit and so the compression. We could continue to use cylinders of cast iron, fit detachable heads, and machine them true after bench tests until they had taken a permanent set. Or we might improve the cooling, and so kill distortion at its root. This might necessitate the use of steel cylinders, or of aluminium alloy with a bore liner and valve seatings of another metal. Anyhow, my main point is to enquire how far the average motor cycle engine builder has taken the possibility of cylinder distortion into account, and attempted to grapple with it, and I have strong, though secret, reasons for asking the question. My attention was first drawn to the point when I became acquainted with the phenomena of cylinder distortion on the earlier types of air-cooled aero engines, exaggerated as it often was by the fact that in an engine with a large number of cylinders, it was difficult to ensure an even draught for them all. If cylinder distortion in such extreme cases is sufficient to render an engine unserviceable, it is at least possible that it is a very adverse factor on a small single-cylinder engine, especially when climbing a stiff hill on a very low gear with a sidecar attached: and the unquestionable success of the Harcourt auxiliary aluminium radiating fins and other devices of a similar nature points in this direction.

The Babies on Sunrising.

I AM afraid my interest in the reports of clean ascents of Sunrising by single-geared babies is still tinged with a faint incredulity. I can only say that I have never owned or driven a baby two-stroke which would look at this hill on a 6 to 1 gear. Moreover, I am old enough to remember the days when all motor cycles were single-geared and various experts used to tour the country with a pressman and a camera in tow, and do useful advertising stunts by climbing such hills. Of course, I am recalling ancient tales, and a 3½ h.p. engine of to-day could romp away from the best we had then. But I generally found that clean ascents of such hills on a 3½ h.p. were only possible to crack lightweight riders on specially tuned engines under perfect road and weather conditions, and with gears ranging from 5½ to 6½ to 1. So when a modern amateur, picked at random, on a 2 h.p. machine bought through ordinary channels, claims that he can laugh at these stiff climbs, it is equivalent at least to saying that the modern 2 h.p. baby is better than the specially prepared 3½ h.p. of not so very long ago. I know that my two-strokes have both weight and windage against them, but rushing a short pitch of 1 in 9 generally represents their climbing limit on a single gear.

"Dry Sump."

A CORRESPONDENT, who has evidently been reading Mr. Coatalen on aero engines, suggests that motor cycle engines heat their oil until it is over thin, and that our machines would be vastly improved by a "dry sump" system of lubrication. It is never wise to theorise on points which have not been tested, but there are obvious objections to his suggestion, and obvious improvements which deserve attention before so radical a change is tried. A dry sump practically necessitates the elimination of splash oiling, on which practically every motor cycle engine depends for the bulk of its oiling. Even where the piston dips into its own private oil well, all the rest of the engine is splash lubricated. To dispense with splash entails a great increase in manufacturing costs: and this point alone is probably fatal. It might be possible to arrange a well, from which a dipper could pick up sufficient oil for splash purposes, to catch the return drippings, and lead them through a special oil cooler, but we do not know that such a plan would be effective. I am rather inclined to fancy that if we trapped most of the oil which is now wasted in the form of carbon deposits or ejected from the tappets, our oil economy would reach satisfactory dimensions.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

AFTER-THE-WAR PROBLEMS.

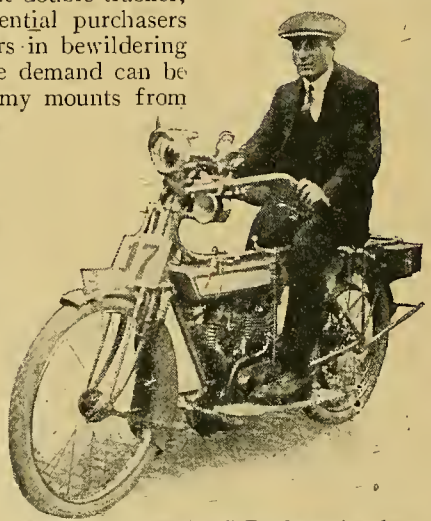
Opinions on Post-war Manufacture of Motor Cycles, and a Suggestion regarding the Disposal of Army Mounts when Hostilities cease.

In the issue for January 18th, 1917, we gave the impressions of Eric Williams, D.C.M., holder of the Junior T.T., on the design of present-day motor cycles, and his opinion on weaknesses to be avoided in designs of the future. We now have pleasure in recording the ideas of another well-known rider, A. J. Sproston, who expresses his views on the post-war production of motor cycles. He also suggests improvements which might successfully be embodied on models of the future, and deals with the question of the disposal of army mounts after the war. It is significant that both Williams and Sproston express the opinion that the four-cylinder engine will be the unit for the sidecar mount of the future.

THAT the question of post-war production of motor cycles presents a complex problem is not generally admitted. It appears to me that the difficulties are not patent to those who demand the early realisation of the ideal in solo or passenger vehicle, and while I concede to makers that perfection should not be expected to follow hard upon the heels of the conclusion of hostilities, I will not admit as justifiable a continuance of their pre-war policy of comparative apathy. In evolving the lightweight they certainly strove, but even here it is evident that initiative became subordinate to output. A reasonable time having elapsed after the proclamation of peace, we should witness fruitful signs of the incorporation in new models of lessons learned under bitter circumstances. Probably the number of manufacturers exclusively devoted at present to the production of their normal wares, and thus able to conduct experiments on bench and road, could be counted on one hand, so we may assume that at least twelve months would elapse before deliveries could be made upon a wholesale basis. In connection with the latter much can be done in the future by closer co-operation amongst manufacturers and concentration upon single or certainly a more limited range of models. I do not lose sight of the fact that the supply and arrangement of labour, disruption of plant and office organisation, will temporarily prove a real barrier.

Potential Purchasers.

The grim game of war has demonstrated the boundless possibilities of the single and light double tracker, so on discharge from the Army potential purchasers will be launched at the manufacturers in bewildering numbers, each with ready cash. The demand can be met in a measure by taking over Army mounts from the authorities, subjecting them to a systematic overhaul, and passing each through the usual trade channels, backed by the maker's guarantee. This process would have the triple effect of (1) stemming the demand indicated, (2) maintaining second-hand prices on a legitimate basis, and (3) obviating the prejudicial results to the industry that would accrue by passing war-worn machines direct to the inexperienced. Turning to the necessity of our maintaining the lead in excellence of construction, few, I think, will deny that we can give points to our heavy American rival. In matters concerning detail, it cannot be denied that we are behind. In the lightweight and mediumweight class we can fairly claim ascendency over our Ally's product, but our makers are yet wedded to out-of-date methods determining cycle construction, and the reluctance they have shown to deserting push cycle practice provides an easy road to stagnation. We still find the vulnerable gear box suspended from the bottom bracket instead of accommodation being found it in a housing integral with the frame. Mechanical lubrication is introduced half-heartedly, and makers in many instances defy the entreaties that our magnetos shall be placed away from mud and danger. To conceal control cables presents no insuperable task any more than does correct mounting of the speedometer or enclosing its drive. The discriminating buyer *does* demand handle-bar operation of his clutch. By reason of its necessarily open construction, the motor cycle can never represent the acme of cleanliness in use, but even the advanced details of weather-proofing improvements leave much to be desired.



Cpl. A. J. Sproston, R.E., despatch rider, now in India.

Weather-proofing.

The Motor Cycle has consistently urged reform in this respect, and we hope will not relax its efforts until the evil be eliminated. As a dirt distributer the mediumweight takes pride of place over its bigger brother. This unenviable state of affairs principally arises out of the unwillingness to add to first cost and to the desirability of keeping the weight within reasonable limits. I am convinced that before we shall have long settled to our peace routine both types of the big twin will find their popularity seriously menaced by the four-cylindered power unit. This type, especially for passenger work, will be able to offer what the former could never promise. Not the least advantage of the "four" is that its power plant can be shorter than the big flat engine, for I see no reason why cylinders should not be cast in pairs, clutch and gear box common with engine base and carburetter centrally situated. The bogey of complication will fade before the manifest advantages of silent, sweet, even running and accessibility, decrease in petrol, oil, and tyre consumption. Because dynamo lighting and engine starting can be singularly well adapted, here we shall have an outfit appealing to the most fastidious. To the single, the day

After the War Problems.—

is not far distant when the manufacturer will find his enthusiastic adherents few and far between, and the little then to be said for the pioneer type will not justify its production where dividends are concerned. Our association with the "one-lunger" is linked with gratitude for faithful service; through the calamity of war it has probably carved a name to be remembered in history, but sentiment should not retard progress. If post-legislation stands by the industry in its struggle for rehabilitation, it is not too much to say that the outlook will then be of a vast and encouraging character.

In summing up, then, I have expressed the definite view that the faithful "one lunger" is to be superseded, and that the sidecar machine of the future will be equipped with an even-turning four-cylinder engine —truly an outfit *de luxe*.

A Soldier's Trip to Visit a Wounded Brother.

A 373 Mile Journey with a Sidecar on Five Gallons of Fuel.

AS I had received news of my brother's arrival at a Bristol hospital and considered it necessary to visit him as soon as possible, I decided to use my motor cycle and sidecar for the journey, as the Sunday service of trains was not suitable.

Referring to my stock of "blue covers" I found in Recommended Routes what I required, viz., a route from Liverpool to Bristol. I went over this on the map with coloured ink, and made myself familiar with the names of the small villages, which I think is very necessary when time is of importance.

My machine is a 1915 4 h.p. A.J.S., my passenger my old dad, and this was his first offence this year as a "pleasure" rider. We crossed the ferry from Liverpool to Birkenhead, and were soon ticking merrily along through Chester. Leaving this pleasant old town behind we made for Whitchurch, a clean looking little place. Here the courteous military police directed us *via* Hodnet to Wellington, where we decided to have lunch. Leaving Wellington at 2.15 we dropped down through Dawley and Stockton to Bridgnorth, where we got in touch with the River Severn, which was the guide for the rest of our journey. The roads from here through Worcester and Tewkesbury to Gloucester were perfect. Arriving at Gloucester at 5.45—our first stop from Wellington—we filled up again, having done 140 miles on 1¾ gallons.

A Short Walk.

While I was doing the needful my father proposed to walk on for a change. I overtook him about half a mile away talking to an old rustic about the lad he was going to see, and he confessed, as he was making himself comfortable, that he had seen more of England in six hours than he had seen in the previous sixty years or so.

We arrived at our destination at 7.30, dusty but perfectly satisfied with everybody and everything. We were kindly received at the hospital, and were soon at my brother's bedside (he had arrived from France not much more than twenty-four hours previously). It was soon time for the lowering of the lights, so we bade him good night, promising to be in early next morning, and tip-toed out of the ward. As we got to the door we received a cheery good-night from the row of white cots, the boys in this ward seeming in excellent spirits.

Next morning we rose at 6.30, and looking over the old 'bus found everything in good order. We took the outfit inside the lovely grounds down to the ward, obtained permission to see the patient, and loaded him up with good things. We then started back for the Mersey district with pleasant memories of our visit to Bristol.

The Return.

Leaving Bristol at 9.30 a.m., we travelled through Almondsbury, Thornbury, and Gloucester to Worcester, where we lunched. When we reached Whitchurch at 5.25 the weather seemed inclined to be unkind, so we put on a spurt for Chester, arriving there at six o'clock. While we had tea the clouds rolled by.

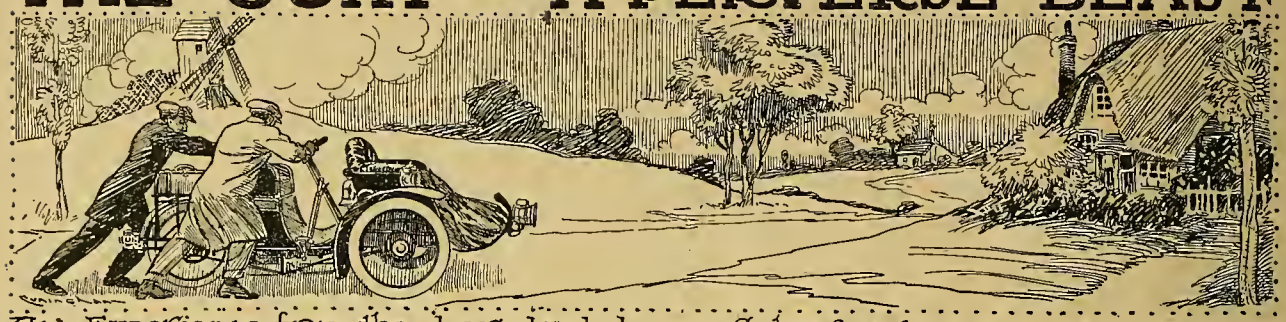
The last part of our journey—Chester to Birkenhead—was the worst; the roads seemed a trifle knocked about, but we arrived home again at 7.30 p.m. without a hitch of any description. My father was delighted with the trip, and said he never felt better. He certainly looked well—the sun and wind having left their traces.

The following are the details of our trip: Average miles per hour, 23¼; average miles per gallon, 74⅗; total distance travelled, 373 miles; petrol, 5 gallons; carburetter, Amac 25 jet.

COMPANY SGT.-MAJ. BROWN.

A few years ago one rarely encountered ladies mounted on high-powered motor cycles, but now it is common to see them handling 7-9 h.p. sidecars with the greatest ease. Mr. L. G. Burrell, of Sidmouth, taught his wife to drive the Harley-Davidson shown in a very short time. The art of gear changing and the steering were readily mastered, we are told.

THE GOAT - A PERVERSE BEAST



An Experience from the dear dead days of long ago

I HAVE come to the conclusion, as I look back to the days of the Goat, that it was my fault. I have always been curiously unlucky in motor matters—not in ordinary ways, but almost invariably in peculiar and unusual circumstances. I am extraordinarily lucky with punctures, I have never broken a valve, I have never been stopped by a sooted plug, and I have never been worried by "rattle" in two-strokes. But, on the other hand, I had six plugs blow out in a year, I have had my carburetter drop off in the road, I have had my magneto platform break off, I have had oil flooding out of the seat-pillar of a Scott till it swamped the magneto, I have burst the insulation of a high-tension carbon brush holder, I have had faulty condensers and collector rings which came off galore, I have bought an expensive carburetter and found that there was no passage between the float chamber and jets (and the maker swears he tests every instrument before it leaves the works!), I have had the magneto timing slip on three different machines in two months, I had an electric rear lamp which always went out even when insulated when the stand was touching its clip, and so on. But none of these misfortunes approach our adventures on the Goat.

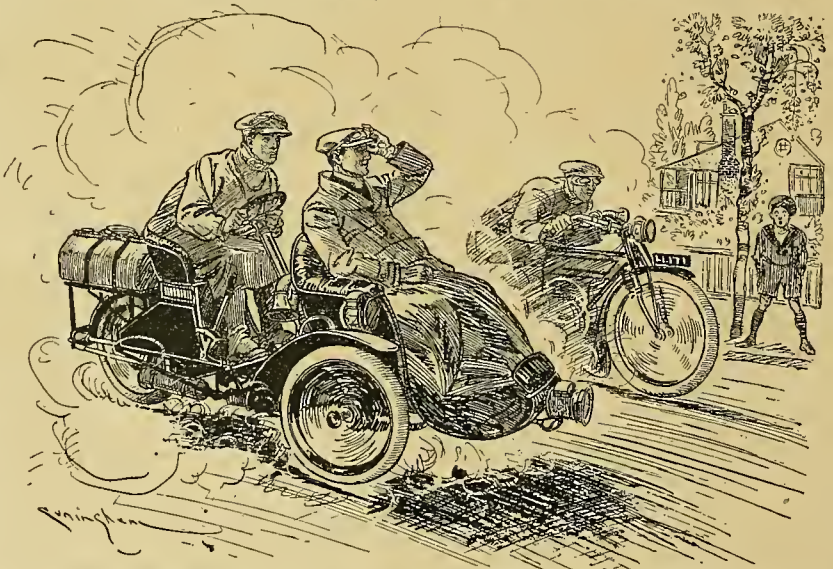
This animal was a 5 h.p. twin tricar, with two speeds, solid chain drive, bucket seat, wheel steering, and accumulator ignition. The owner—whom we will call "G."—asked me to be the passenger from a place near Nottingham to Ledbury in Herefordshire. I, foolishly, jumped at the idea—it was nearly eleven years ago, and I had never been in a tricar before, nor, I may say, have I been in one since.

Our route was to be Nottingham, Ashby, Leicester, Rugby—this was afterwards changed to Coventry — Warwick, Stratford-on-Avon, Evesham, Tewkesbury, Ledbury. We started about ten o'clock in the morning on a Friday—ominous day—in July. Nothing worse than the throttle control coming adrift happened in the first few miles, but half-way between Nottingham and Ashby we ran over a patch of unrolled stones, which brought the driving chain off. It was a mild foretaste of the *bonnes bouches* (save the mark!) to come. We had hardly passed Ashby before we began to lose power until we crawled along on low gear, and had to get out and run up every slope. We arrived at our lunch stop at 3.30, and spent the rest of the afternoon trying to find out what was wrong, and after tea we again took the road, but not before we had spent half an hour in trying to start. However, by the time we reached Leicester—a distance of five miles—the Goat gave it up altogether, and we pushed it to the nearest garage, where we were greeted by a supercilious youth, who said there was nothing wrong, and injected paraffin, on which, strange to say, the engine immediately started, and we got through the town before it once more gave it up.

An Enthusiast.

We pushed back to a near garage to find only the proprietor—and him nearly prostrate with fatigue, having just got back from a London-Edinburgh run, from which he had retired with a bad smash. I should like to say in parentheses that he was a sympathetic fellow, but wildly enthusiastic about a low-tension magneto with which his machine was fitted. I have often wondered since how long that enthusiasm lasted.

But to return to our muttons, this optimistic fellow promised to set the Goat on its somewhat tottering legs by eight the next morning, and so we sought an hotel. We, to tell the truth, rather doubted the fulfil-



"Next morning, after a short overhaul, we started in fine form, and gave a 2 h.p. Minerva quite a race till we reached a slope, up which we had to push."

"The Coat."—

ment of his promise, and, sure enough, on arriving at nine o'clock next day we found the cylinders off and one piston with a huge hole in its head—no wonder we had lost power. A neat patch was screwed on, and at two o'clock we once more started, and had far and away the best bit of our trip, for we completed the run to Coventry in two hours! Here we left the Goat in a garage for a general tightening up while we replenished the inner man, having had nothing but twopennyworth of chocolate since breakfast. All went well till we reached Warwick, when, as we were leaving the town, the driving chain came off; this performance was repeated eight times before we reached Stratford, where once more we sought a garage, and investigation showed that the whole engine had shifted an inch in the frame.

We rectified this with an iron bar and a hammer, and then discovered that the clutch operating pedal—an awful contraption about 2ft. long with three right-angle bends—was cracked nearly through. We decided to dispense with it altogether, as the gear could be changed without it quite easily, so it was strapped on behind, and about 10.30 p.m. we left Stratford. All went well till we reached —— (which had better remain anonymous!) a famous village on the Avon, where there is a distinct slope down the main street. We arrived about eleven o'clock, and the publichouses were just emptying—the place has the reputation of liking its beer too well!—and so here the Goat took it into its perverse head to run away.

Our Only "Blind."

I do not profess to understand how it happened, but the switch on the steering wheel refused to act, and I suppose everything else jammed, but anyway G. could not stop it, and we charged gaily down the street, far faster than we had ever gone before, yelling at tipsy yokels. At the bottom of the slope G. managed to reach the switch on the accumulator, and our one and only "blind" ceased abruptly, and we decided to go no further that night. We therefore marched into the hotel demanding supper and beds. We could have the former, we were told, but the latter was out of the question as they were full up; however, they would try and get us beds in a cottage next door if we liked. We were too tired to go elsewhere, so we agreed on the assurance that the beds were "very nice." Oh! that night. The beds may have been very nice, but their numerous inhabitants were very much the reverse. Let us discreetly draw a veil over the busy scene.

Next morning, after a short overhaul, we started in fine form, and gave a 2 h.p. Minerva quite a race till we reached a slope, up which we had to push. A minute or two later I heard a horror-struck voice over my shoulder, "The oil pipe has broken," and so we went on in momentary expectation of a seizure until we reached Evesham, where, being Sunday, it took us two hours to find a man who could do the necessary soldering. We then went without mishap as far as Tewkesbury, but as we were leaving this town we discovered that one of the two long screws which fastened the "make and break" was missing. We screwed the other up—we had to repeat this performance every mile or so—and proceeded gingerly. About ten miles from our destination one of the exhaust pipe unions broke, and so we ended the journey sounding like a Maxim gun, the gases exhausting on to the only place where G. could comfortably put his right foot. For these last ten miles, I, being well known in the district, remained discreetly goggled, in the hope of not being recognised! Hence many ribald jeers from G. We arrived at four o'clock in the afternoon on Sunday, having taken since ten on Friday morning to cover the 160 miles.

Good-bye to the Goat.

I can only say that the Goat must have foreseen my ill-luck with motors, and was doing its level best to dissuade me from having anything more to do with them—anyway, that is the most charitable view of its performance. Poor old Goat! G. accepted £10 for it, in part exchange for a new model, the very next day. I often think of it now when anything exceptionally exasperating happens—as, for instance, when, the other day, I broke my throttle wire at the foot of a steep hill in Cornwall, and had to push to the top to get a repair; the wire could not be changed over from the air, as the carburetter was an automatic.

In conclusion, let me say that no misfortune has ever deterred me: I am still an enthusiastic motor cyclist, and—"though I say it as shouldn't"—I am a nailer at diagnosing obscure troubles, even if I cannot cure them!

PARSON.

"THE AUTOCAR HANDBOOK."

THE seventh edition of "The Autocar Handbook" has just been published. The whole of it has been thoroughly revised and brought to date. To the majority of readers this guide to the autocar may be familiar, as it is recognised as the standard text book for motorists.

To those who may not be acquainted with it, one can truthfully recommend it as containing the most comprehensive and accurate information possible to be conveyed in 300 pages of reading matter. Commencing with an exceptional and fully illustrated description of the petrol engine, its parts and their functions, it deals, in turn, with the various parts of the car, and describes in plain language their construction and purpose, and gives practical hints on the best means of keeping them in order. Later chapters treat with the care and management of the car, accessories, tools, and spare parts, and there is a useful summary of various laws affecting motorists.

The book throughout is amply illustrated with diagrams, sketches, and photographs. The price is 1s. 9d., post paid 2s. 2d. Iliffe and Sons Ltd., 20, Tudor Street, E.C.4.

THE NEED FOR PAPER ECONOMY.

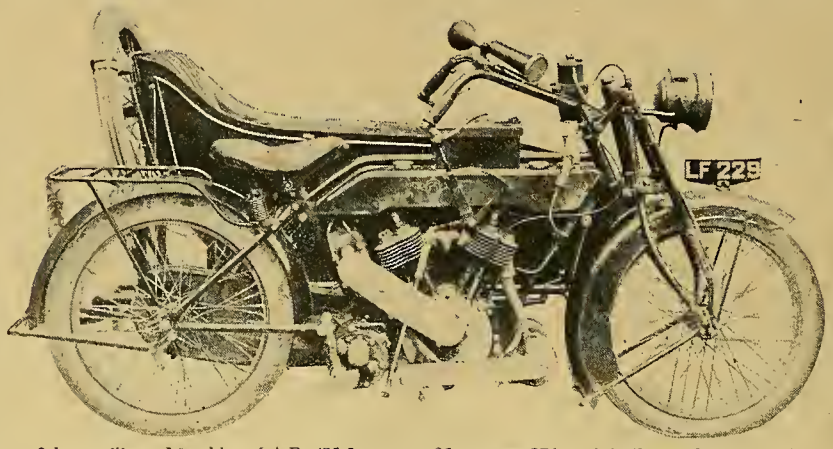
The only way to ensure regular receipt of this journal is to place a definite order with your newsagent or the publishers.

This action will enable newsagents to limit their orders to the actual number of copies required, and so effect a saving of paper, labour, and railway transport.

THE MATCHLESS MILITARY MODEL.

Another Machine Strengthened and Adapted to the Requirements of the Russian Army.

FOR some time we have known that Messrs. H. Collier and Sons have been the recipients of an order for several hundred sidecar outfits for the Russian Government, and, hearing last week of their completion, we took an early opportunity of inspecting one of these machines with a view to adding it to the long list of Russian military machines with which we have dealt. During the last two years we have become so well accustomed to describing machines which were not intended for sale to the general public that it is quite refreshing to learn that a certain number of these machines will be available for private distribution.



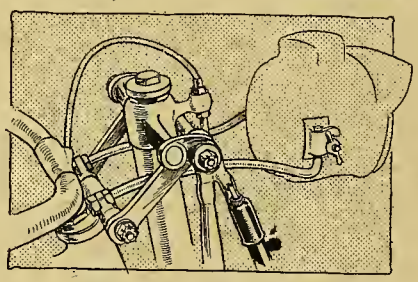
8 h.p. military Matchless J.A.P. (85·5 mm. × 85 mm. = 976 c.c.) built to the order of the Russian Government.

This new and powerful Matchless sidecar will be known as the 8B2/M Russian military model. It is an excellent outfit, which, while presenting no very startling innovations, is a sound and practical job, calculated to give absolute satisfaction under the most trying conditions. It is a curious yet absolutely rational conglomeration of features peculiar to the already-described flat twin and the M.A.G. engine models, and it must be borne in mind that this machine has been built to specifications drawn up by the Russian military motor cycle experts.

The Power Unit.

The source of power in this military model is derived from a standard 8 h.p. V-twin J.A.P. engine, having a bore and stroke of 85.5 mm. × 85 mm., and following the latest J.A.P. practice throughout. The lubrication is automatic, while extra oil is delivered from a Best and Lloyd combined pump and drip feed, the oil pipe having a branch near the crank case union by which oil can be fed direct to the clutch.

The Dixie magneto is chain-driven, and is carried on a bracket forming part of the steel plates bolted to the frame lugs and serving to hold the engine in position. An extension of the engine plates serves to carry the platform to which the magneto is bolted, and the magneto itself is held by bolts, which enable it to be raised or lowered.



The special lamp bracket. Note the lugs on the horizontal tube of the spring fork.

The carburetter is the standard form of two-lever Amac, fitted with a warm air intake, which has been a feature of Matchless motor cycles for some years.

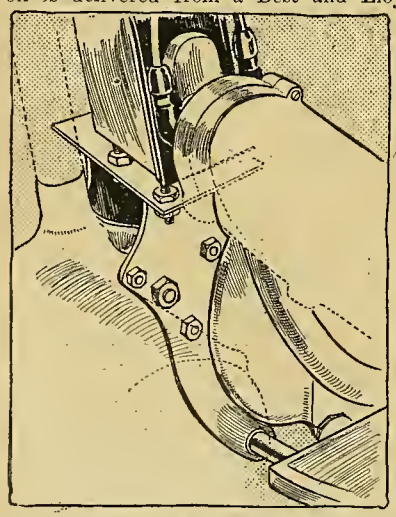
The clutch actuating mechanism, gear box, and totally enclosed chain transmission, including the silent chain drive from engine to gear box (a feature of the M.A.G. and H models), are retained, while the silencer, instead of being of the pattern usually provided with Matchless sidecar combinations fitted with J.A.P. engines, consists of the larger expansion chamber and long extension pipe.

Other features which have been common to the model H are the exceptionally wide and efficient mudguards, the guard to the front wheel having excellent side shields. From the later model H the new type of gear lever quadrant and the improved handle-bars have been adopted. As is the case with the later type of Matchless sidecar combination, all wheels are detachable and interchangeable, but in the new Russian machine there has been fitted a special lubricator designed to allow the spout of a grease gun to fit it exactly, so that an ample quantity of lubricant can be injected under high pressure. It is especially essential that these hubs receive sufficient grease, as not only does the injection force out and exclude grit, but it enables the wheels to be easily and quickly detached, whereas lack of lubrication causes sticking and rust. A comfortable Brooks saddle and footrests assure comfort and good control for the rider, though the handlebars necessitate rather an upright position for rough riding.

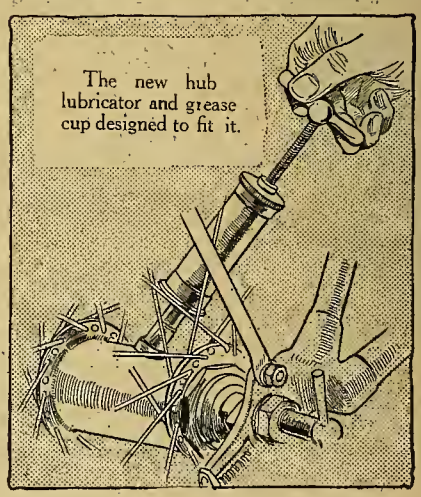
The lamp bracket, specially made by Collier and Sons for either Lucas electric or acetylene head lamps, is worth mentioning, as it bolts direct on to lugs forming part of one of the horizontal front fork tubes. The sidecar, which is bigger than standard, is provided with a strong and roomy luggage carrier, and mounts the spare wheel at the rear. The sidecar body is suspended on spiral springs, but the Matchless system of springing the sidecar wheel is not incorporated in this model. The sidecar frame is of great strength, and is suitably trussed to preserve rigidity.

On every machine instructions are printed in Russian on the top of the tank, the latter being of ample dimensions, and is provided with large filler caps, that to the petrol compartment being glass-topped.

Altogether the machine has been thoroughly well thought out, and though not perhaps quite so comfortable as the pre-war 8B model, it is a really serviceable mount.



New magneto bracket and platform.



The new hub lubricator and grease cup designed to fit it.

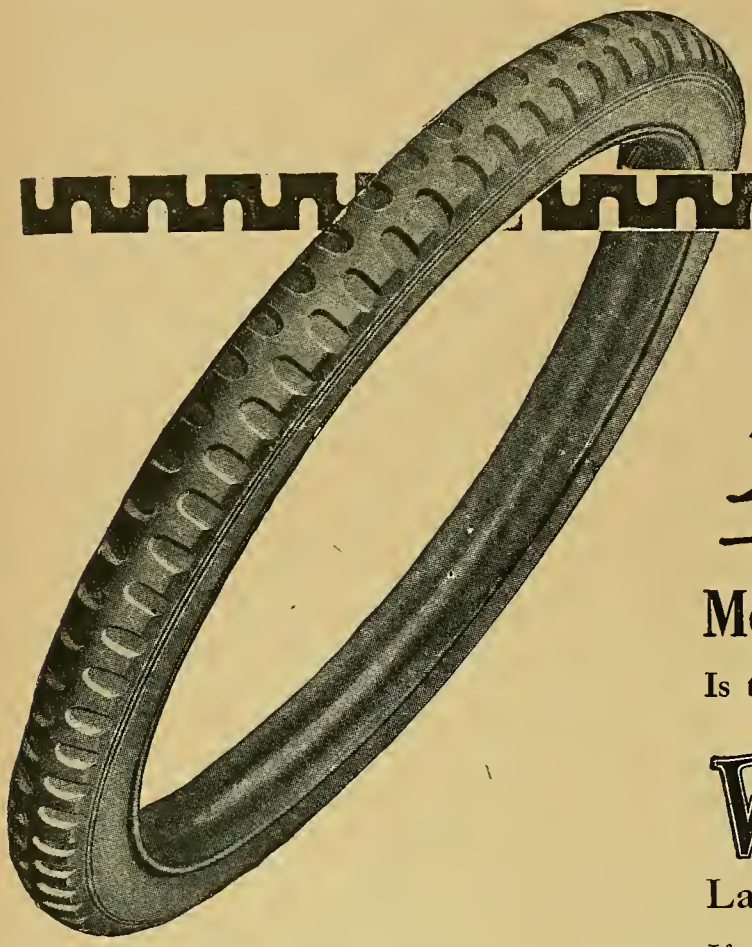
ARIEL

In the war—on every front—the Ariel has surpassed all its wonderful pre-war performances: defeating challengers to its long-held reliability supremacy as thoroughly as it always did in peace-time contests.

Confirmed by despatch riders, motor machine gunners, motor ambulance and convoy men

32 page art list, post free.

ARIEL WORKS, Ltd.,
3, BOURNBROOK, BIRMINGHAM.



The

Keygrip

Motor Cycle Tyre

Is the latest production of the

Wood-Milne

Laboratories and Works

If you would know what it is to be absolutely free from Tyre trouble, to be able to negotiate the "toughest" piece of road without wondering "what is going to happen next" — or finding out, then fit the new Wood-Milne "Keygrip" Tyre.

These tyres are made on the most generous lines, and the very heavy tread gives a degree of comfort hitherto unknown.

With "Keygrips" on, it is goodbye to aches from jarred wrists and back.

Write for our latest List.

WOOD-MILNE, LTD., Preston.

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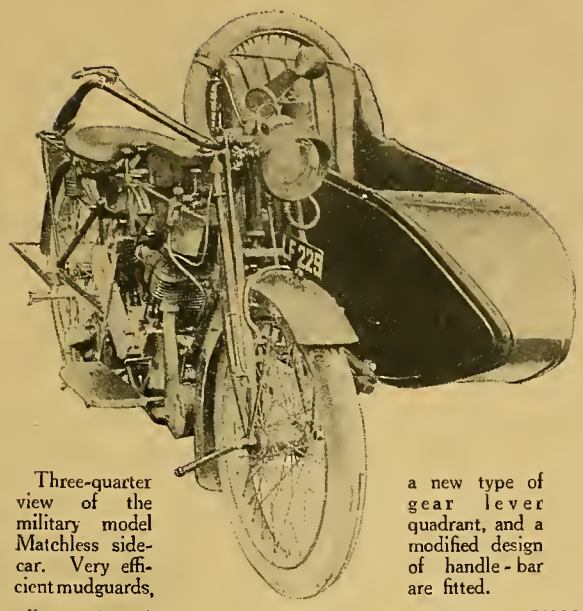
M.C. 508.

THE MATCHLESS FLAT TWIN.

THE post-war Matchless, which, as our readers are aware, has a flat twin engine, has fully come up to the expectations of the designers except in one respect. After being tested for many months, Messrs. H. A. and C. R. Collier have decided that for sidecar work, where a good average speed and speed uphill are desired, a larger engine is necessary, and so experiments will be carried out with an engine of 75 mm. bore. Hitherto the experimental Matchless flat twin has had a bore and stroke of 70×95 mm.



Three-quarter view of the military model Matchless sidecar. Very efficient mudguards, a new type of gear lever quadrant, and a modified design of handle-bar are fitted.

BERKSHIRE MOTOR VOLUNTEER CORPS.

MOTOR cyclists in Berkshire are invited to send in their names as willing to join the Motor Cyclist Section of the above Corps.

The War Office has accepted the offer of the Berkshire M.V.C.'s service of a Light Squadron, and offers have been sent in for a second Light and of a Heavy Squadron, for which cyclists are required.

Conditions of service are now so well known that it is not necessary to repeat them.

SPECIAL HIRE PERMITS.

THE Petrol Control Committee has given further consideration to the question of the issue of special permits for motor cars to be let for hire for certain specified purposes, in accordance with section (c) of Regulation 8 G.G. of the Defence of the Realm Regulations, and it has agreed, after consultation with the Motor Hire Section of the Motor Trades' Association, to issue such permits subject to special conditions.

THE ADVANTAGES OF CO-OPERATION.

AT a meeting of the Motor Cycle Section of the Association of British Motor and Allied Manufacturers, Ltd., recently held in Birmingham, the question of co-operation among groups of British manufacturers was favourably considered. A number of members of the section agreed that in certain spheres of development co-operation should have a very beneficial effect in strengthening the British industry. These manufacturers also discussed and agreed upon certain fundamental conditions which were regarded as essential to be accepted by any firms that might participate in the scheme under discussion. The general trend of opinion was such as to give rise to optimistic views as to the possibility of securing by co-operation substantial economies in manufacture and selling.

Following upon this preliminary discussion of the subject, further meetings of the section, or of manufacturers interested, will be held with a view to going into the matter in more detail.

Any communications on this subject should be addressed to the Secretary, the Association of British Motor and Allied Manufacturers, Ltd., 1, Regent Street, London, S.W.1.

An All-British Badge.

The badge here illustrated has been adopted by this Association, and is to be used as signifying membership of this association. Readers may be reminded that the association exists as a combination of British motor manufacturers, and no firm is admitted to membership ere its claims have been carefully reviewed by the most critical tribunal possible—that of the firm's own competitors. The appearance of this badge on the note headings or trade literature will, therefore, stamp any individual firm as all-British in every sense of the word.

New badge of the Association of British Motor and Allied Manufacturers.

TANK CREATOR.

MAJ. WALTER G. WILSON, who received the C.M.G. in the Birthday Honours List, is the officer who, with Sir William Tritton, worked out the mechanical design of the first of the Tanks for the Admiralty Committee, of which Sir Enstace Tennyson d'Eyncourt was chairman. Sir William Tritton was knighted last January.

J.A.P. CATALOGUE IN THE RUSSIAN LANGUAGE.

THE comprehensive and fully-illustrated catalogue Messrs. J. A. Prestwich and Co. send out relating to their 6 and 8 h.p. engines has been translated into the Russian language. This catalogue is certainly one of the most complete of its kind we have seen. There are scores of both half-tone and line illustrations among matter most clearly expressed concerning every detail of engine construction.

ELECTRIC LIGHTING FROM THE MAGNETO.

THE primary currents of various makes of magnetos vary very considerably as regards their suitability for the purpose of lighting lamps, and though no harm can be done to a magneto by using the primary current in this way, it must not be thought that any magneto is immediately applicable. With some, difficulty arises owing to the absence of an earth terminal, while with others the current generated may be too weak or too strong.

The makers of F.R.S. lighting sets inform us that they have come across magnetos so powerful that they can burst or burn out as many as three bulbs at a time, while others are too weak to give the necessary light unless the set be specially arranged.

WHICH TYPE OF MACHINE?

RECENTLY we have received several enquiries from prospective lady riders—who are taking up work of national importance which necessitates the use of a motor cycle—as to which type of machine we recommend: a two-stroke, a small four-stroke, or a small twin. This is the kind of simple question which sets one thinking. Offhand, and without much consideration, one would naturally name one's fancy, but, weighing up all pros and cons, which really *is* the best type of machine for an uninitiated lady rider? Surely everything depends on the individual mount, but will those with timely views to express kindly express them?

THE USEFUL SPECIALS.

ONE is inclined to think that the special constable is a person who delights in making himself a nuisance, and idles his time aimlessly patrolling the roads and in making himself objectionable if, in his opinion, too much light is showing from the windows. The other evening, however, a couple of specials saved a motor cyclist from what might have been the complete destruction of his Sunbeam sidecar. While the owner of the outfit was visiting a friend's house there was a prolonged ring at the door, accompanied by violent rapping. The summons was made by two specials, who reported that there was something wrong with the lamp. The owner of the machine and his friends arrived just in time to snatch away the burning rubber connection of the tail lamp, but it was found that the rubber tubing also was alight, and the flame had to be blown out, pinching it only resulting in burnt fingers. Had the machine been left, the tube, which was well alight, would have allowed the flame to creep right along to the generator, situated just underneath the petrol tank, with probable results which may well be imagined. Thanks to the two specials, the valuable combination was saved from being burned.

Current Chat

TIMES TO LIGHT LAMPS.

Summer Time.		
June 14th	... ...	9.46 p.m.
,, 16th	... ...	9.47 ,,
,, 18th	... ...	9.48 ,,
,, 20th	... ...	9.48 ,,

Growth of Spring Frames.

Ninety-three designs of spring frames for motor cycles have been illustrated in these pages since *The Motor Cycle* campaign was launched in 1915.

Stolen Harley—£10 Reward Claims.

Several claims have been received for the £10 reward offered for information leading to the recovery of a Harley-Davidson outfit stolen from Capt. T. J. Ross. The latter informed a correspondent that the insurance company are dealing with the claims and their decision must be regarded as final. Will the award be pooled?

Warrington Warriors.

We are informed that Warrington was well represented in the motor volunteer meeting, held at Blackpool and reported in our last issue. Nineteen motor cyclists from this ancient borough attended, the detachment being one of the few in full rig. Besides its motor cyclists, Warrington can boast a Heavy Transport Squadron, and also twenty-four Ford vans as a Light Car Squadron.

Foreign Catalogues.

We have received from the Commercial Intelligence Branch (Foreign Samples Section), Board of Trade, 32, Cheapside, London, E.C., an index of foreign catalogues. These catalogues may be seen by United Kingdom manufacturers at the above address, or, where it is not convenient for manufacturers to inspect the catalogues in London, they will be lent for short specified periods. The catalogues are issued by German and Austro-Hungarian firms.

An Over-zealous Policeman.

A correspondent of ours living in Wales is the holder of a licence for six gallons of petrol, and has a small stock. Recently the local police constable called on him and informed him that he was forbidden to use his motor cycle, and two friends of his also received a visit from the policeman giving the same information. We wrote to the reader in question, and told him that the policeman was acting outside his authority, and we hear in reply that by the time our letter was delivered the over-zealous constable had been round and told local motorists that his instructions had been incorrect.

A Mysterious Defect.

Recently correspondents have described a mysterious "pulling up" experienced on occasions with comparatively new machines. This is the sort of phenomenon to be solved only by those who have had similar experiences, and a correspondent this week infers that the defect may be due to back pressure.

Pigs is Pigs!

We notice that a Manchester evening paper includes pigs in its small advertisements under the heading of "Motor Cars and Motor Cycles." Between an advertisement for sidecar bodies and one for a Calthorpe lightweight, appears an announcement to the effect that the owner of twenty strong pigs and three gilts is willing to dispose thereof. Is this another uncharitable insinuation on the part of the anti-motorist press?

SPECIAL FEATURES.

FROM THE CAULDRON OF WAR ANOTHER MILITARY MODEL.

Penal Servitude for Motor Cycle Theft.

At the London Sessions, William Smith, alias John Craig, who was described by the police as one of the worst and wickedest criminals in London, was sentenced to three years' penal servitude for stealing a motor bicycle.

Still at Large.

The fourteen-year-old Blackburn boy who was recently brought before the magistrates for driving a sidecar which, it was alleged, was a motor car within the meaning of the Act, is, we are informed, still using his machine daily.

WOUNDED SOLDIERS' OUTING ON THE MERSEY.

The Lancashire Motor Volunteers last week helped to convey 500 wounded soldiers from the hospitals in Liverpool and surroundings to the landing stage on the Mersey, where they embarked for a sea trip. The driver of the Sunbeam, F. A. Jones, who is himself a discharged soldier with one leg, is seen transporting two wounded men back to hospital.

A Motor Cycle for Saxpence.

There is still time to send sixpence for a ticket in the Newcastle (Staffs) "draw" for a 2¼ h.p. lightweight Triumph. The funds are in aid of the Red Cross.

"Borrowed" Bradbury's Fate.

A youth who had served in the Naval Brigade at Antwerp, when charged at Bromley with the theft of a Bradbury owned by an officer of the R.D.C., explained that he borrowed the machine for a trial run, but had a smash-up at Brighton, and not caring to return the machine damaged as it was, sold it for a few pounds. He had an excellent character. Bound over and dismissed.

Another War Model.

Details and illustrations of a special military model Matchless appear in this issue; it has a V type engine. Experiments are still proceeding with the flat-twin Matchless engine, already described.

A limited number of the military model may be available for National Service workers after the Russian Army requirements have been satisfied.

A Sporting Event.

Esprit de corps was at fever heat during last week end in a certain Midland town where many of our D.R.'s mounts are made. A civilian who owns a fast Rudge fixed up a friendly sporting match with a military Lieutenant on a Triumph, and they elected that it should come off in the early hours when no one was about. Like all quasi secrets this one leaked to such an extent that the venue resembled a miniature T.T., and there were so many spectators that the rivals with their followings had to adjourn to more peaceful surroundings. Eventually a good mile race resulted in the Lieutenant winning by about five yards, and the civilian is now £1 poorer. The latter is, we hear, burning to retrieve the fortune of his favourite mount and is busy making fresh cams.

Harsh Treatment.

The Oxford Bench have just inflicted a severe fine upon two lady motor cyclists who are acting as despatch riders to the School of Military Aeronautics. It so happened that Mrs. Prentice (*née* Miss Baxter, who rode a Rex in competition), was riding her 6 h.p. Enfield sidecar on a wide road about a mile outside Oxford on the 23rd ult., a girl friend on a 3½ h.p. Indian accompanying her, and both estimate their speed at 25 m.p.h., when they were held up by the police. Later they were ordered to appear in court, and were fined respectively—Mrs. Prentice £3 (licence endorsed), and her friend, who had never been summoned before, £5, and licence endorsed. No times were taken, but the police asserted that the ladies were doing about 40 m.p.h., and that it took them about eighty yards in which to pull up. To add insult to injury, they were made to pay up before leaving the court.

Considering that these two ladies are R.F.C. despatch riders, and that there is no obligation on their part to assist the country, the fines inflicted, particularly in view of the evidence, strike us as being exceedingly severe.

The National Relief Funds.

At the week-end the principal relief funds stood as follow:

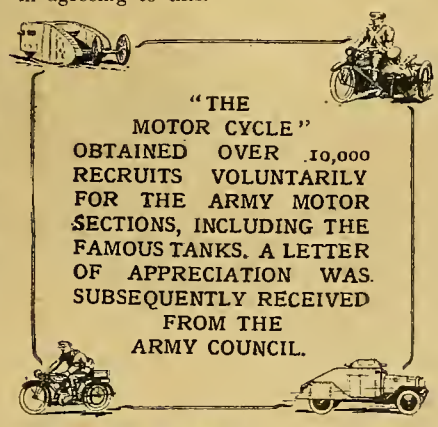
The National Relief Fund (distributed £3,618,015)	£6,196,185	0	0
British Red Cross Fund	6,760,445	19	9
Tobacco Fund	130,970	0	0

The Open Air Life.

Berkhamsted, the town of budding officers, looked very flourishing when we passed through last week. The contrast between the citizens of this "military camp" and those of a toil-worn munition centre was very striking. What would some of our weary munition workers now give to be among the sun-tanned citizens of Hertfordshire.

Worth trying for.

Nearly 2,000 applications for tickets in the Newcastle, Staffs., Red Cross draw followed last week's mention of the chance of winning a motor cycle for sixpence. In advising us of this fact—"amazing result" as he terms it—Councillor S. W. Carryer, of Newcastle-under-Lyme, chairman of the Draw Committee, mentions that other readers have written saying that they will purchase tickets if the results are published in *The Motor Cycle*. We have pleasure in agreeing to this.


"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

The Scare Press Again.

The following appeared in the *Blackburn Times* dated June 2nd, 1917:

"Motorists of every kind had an unpleasant surprise at Blackpool this week-end, for the military barred every approach to the well-known resort and demanded to see the driver's certificate and the petrol licence. They also took the names of those using the motor car or 'bus, with particulars as to where they came from, where they were going, and why the journey was being made. A similar hold-up was going on at the same time in the Metropolitan area, and we are glad to find that the military motorists did not escape the inquisition. As a result, we expect to see a fine crop of prosecutions for evading the law and the regulations, and a check put upon the waste of petrol in joy rides, both by civilians and the military."

A Blackburn rider writes us: "On Whit-Sunday and the following Tuesday we went to Blackpool with our sidecar outfit, but did not see or hear of anyone being stopped, though a large number of motors were about. It is time a censor was appointed to deal with such random stuff about motorists."

On Western Roads.

A recent run over "West Countrie" roads gave an impression of very fair condition with one or two exceptions, notably between Gloucester and Bristol. Repairs are in progress in a few places, but generally this stretch is most uncomfortable, particularly the last fifteen to twenty miles into Bristol, some pot-holey parts being abominable. No doubt the lumbering motor 'bus traffic of the district is in part responsible for the damage, coupled with general war service traffic on the outskirts of Bristol.

A Suggestion for Road Surveyors.

The irregular type of road mentioned above is distinctly annoying. The excellent stretches tempt one to open the throttle, and no sooner is the smooth running appreciated than one charges into "rough water" again; and the resultant shaking is the cause of much "langwidge."

Could not road surveyors, who have not the labour or finances to carry out efficient repairs, indicate the bad stretches by little red flags at each end, or small notice boards carrying an apology for the state of affairs signed by "Order of the —— Council" would meet the case.

A Record-breaker of Old.

At one time the name of W. Stanhope Spencer was closely connected with Rudge motor cycles, since he set up many world's records on this make of machine at Brooklands, and also competed in T.T. races. Later joining the Triumph Co., he unluckily sustained a serious accident. The other week we chanced upon Stanhope Spencer, who, by the way, in 1915 married the daughter of the First Minister of Labour—the Right Hon. John Hodge, M.P.

He is engaged upon the production of heavy-armoured cars—otherwise known as "Tanks"—and is thoroughly engrossed in his work, and says of it: "The more one knows about the 'Tanks,' the keener one is." He has seen them built from top to bottom, and could "write a book" on "Tanks."

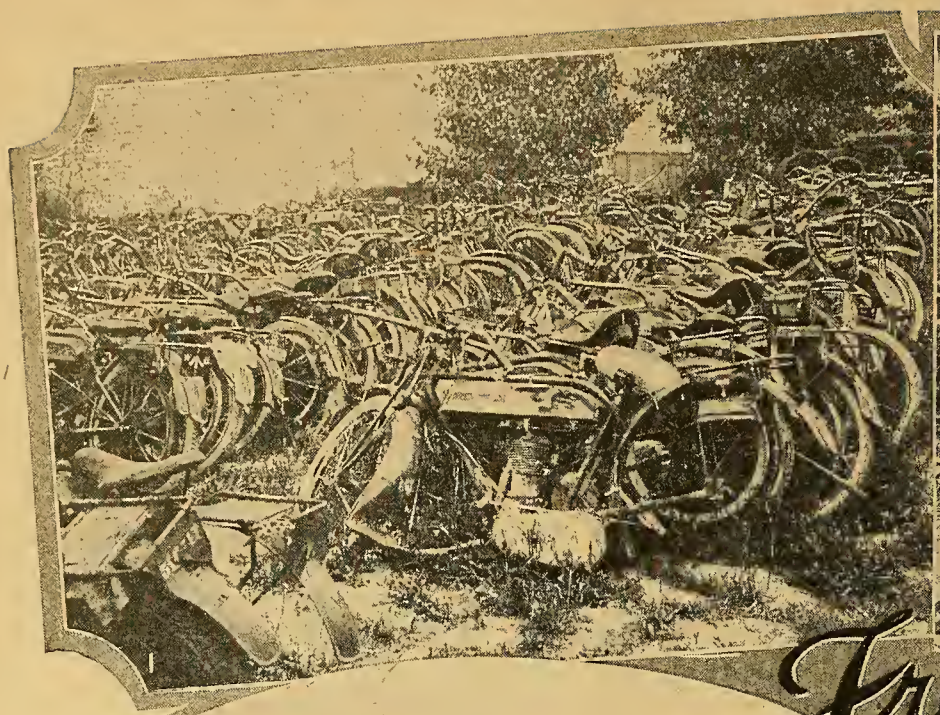
Motor Cycle Storage.

The anticipated additions to motor cycling ranks when peace times return will find the problem of "where to put the 'bus" very difficult to solve. The majority of prospective recruits will be inhabitants of Suburbia, and more often than not "in diggings." There is little room for a push cycle in the modern small villa; a motor cycle is much more difficult to house and liable to cause a serious breach of the domestic peace of the establishment.

It is not too early to predict that the provision of a properly constructed out-building, suitable for storing one or two machines, and the extra width of doorways and side or back entrances to give easy access, will be considered a necessity in the small villa of the future.

Another method we might suggest is to build a larger structure on a portion of land adjoining to serve a group of houses, a small additional rent being charged to those who make use of it.

We recommend this matter to architects and builders as a point in modern villa design worthy of their serious consideration.



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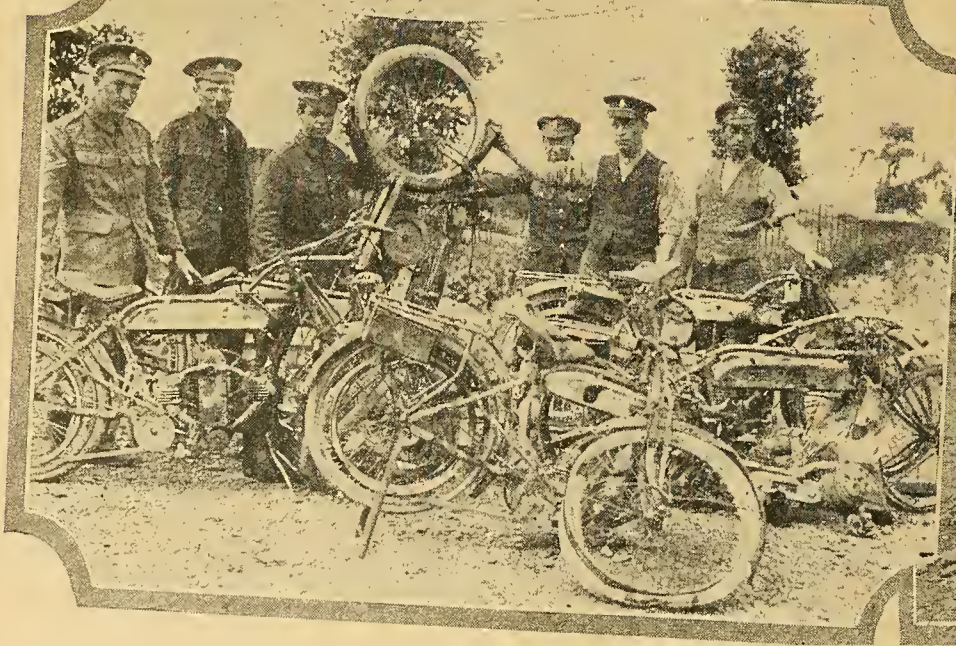


Details of this remarkable ·· which are to be seen stacked i Kent, appear on page 547 Th the battle fronts, put out of com have been shelled, others have

(1) A group of badly war-battered Tr despatch riding is not dangerous work!

(2) A general view of the scores of mo or further service.

(3) Six machines which have received s

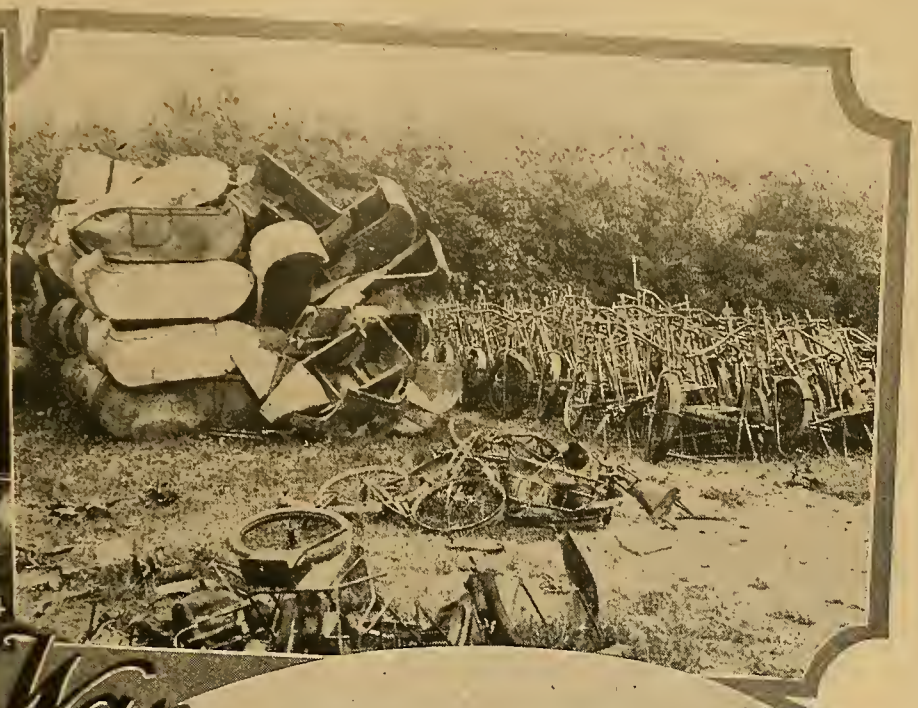
(4) A.S.C mechanics busy in a works dependable than their correct use of Frenc

(5) A war-battered mount War lorries the narrow congested roads.

(6) A mountain of disused sidecar bodi

(7) Another view of the relics: many "hospital." This array does not repres

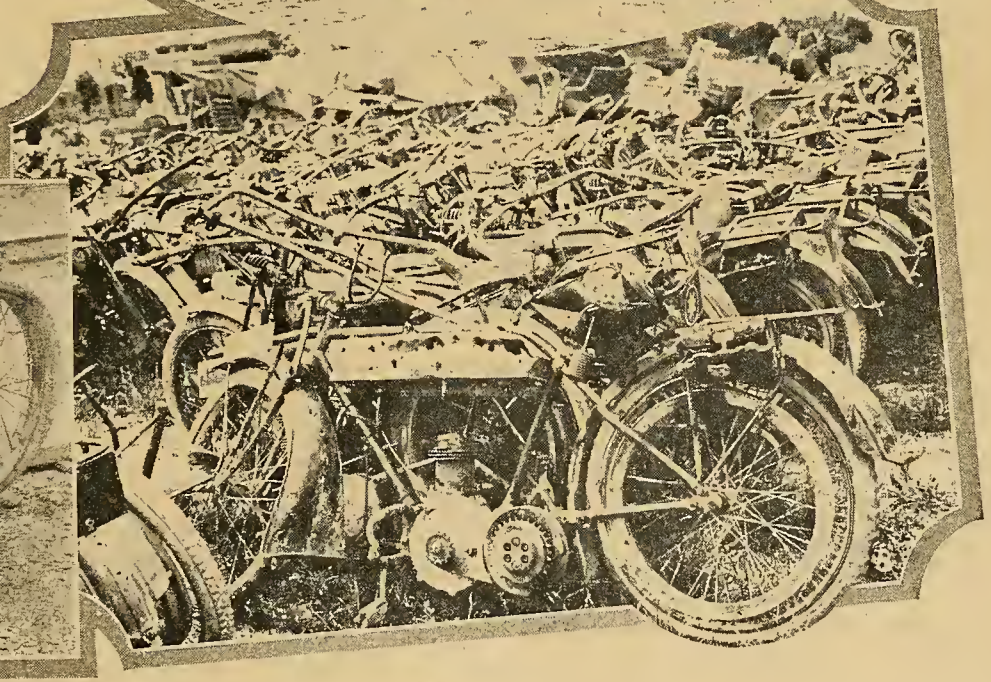
(8) A striking example of a D.R.'s mou the obvious question, but one sincerely

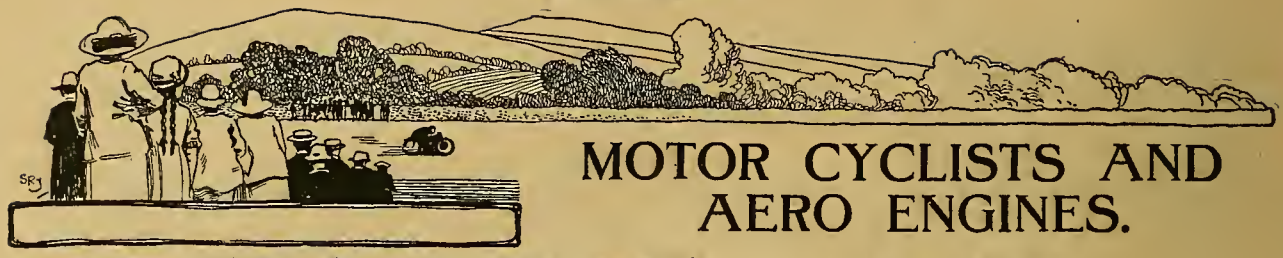


...tion of War

war-scarred motor cycles, at a M T. repair depot in ...es have been returned from ...ough various causes. Most been crushed by lorries.

...rely no one will again assert that ...ch have been "discharged as unfit ...n at the hands of the Huns. Usually their repair work is more ...nore frequent danger than shells on ...led frames and chassis ...ll be rejuvenated after a period in ...any means ...y shrapnel. We cannot answer ...he rider was not mounted





MOTOR CYCLISTS AND AERO ENGINES.

Rotary Engines. Advantages of Two Sparks per Cylinder.

WE were recently chatting with a motor cyclist in the Air Service who must have had an unparalleled experience. From the earliest days he was a mechanic at the aeroplane sheds at Brooklands, and describes how at that time the races which took place so largely devolved upon the man behind the scenes—the mechanic. Most pilots at that time used 50 h.p. Gnome rotary engines, consequently it was a case of who could get the best results from the engine. Since the efficiency of these engines so rapidly falls away, and on account of their fragile nature constant overhauls are necessary, our informant left his work until the last moment, and many a time he has commenced the complete overhaul of a Gnome engine at seven o'clock in the evening and had the work completed after an all-night vigil the following midday—just two hours before the race commenced. Secrets in tuning naturally played a great part; it can be imagined, therefore, that the timing alone required the very greatest skill. The motor cyclist in question now holds an important post on aero engines, and, having handled by the score the various types of engines in use in our flying service to-day—viz., the vertical V and fan types, besides the radial and rotary—confided in us his great liking for the rotary engine.

Interchanging Cylinders.

With air-cooled V engines of the twelve-cylinder pattern he has found that a cure for power loss is often possible by changing over one or two of the cylinders suspected at fault—just why he could not determine. He has proved, too, that a slightly greater tappet clearance for the inlet valve is beneficial. He was emphatically of the opinion that two magnetos and double plugs placed either side of the cylinder give more power, and had satisfied himself of this fact by actual test in the air, using more than one type of engine. By switching off one magneto entirely and chipping in again, there was a noticeable speeding up.

With reference to the effect of altitude upon the power given out by the engine (for it is well known that the density of the atmosphere is diminished as one goes higher up), we were told that up to 10,000 feet he had not been able to detect any real diminution in power, which reply led us in subsequent ponderings to suppose that, firstly, the effect of the reduced density of the atmosphere was neutralised by the mixture becoming richer, and, secondly, the propeller is able to revolve faster in the rarefied atmosphere.

Influence upon Motor Cycle Design.

On the subject of aluminium cylinders with liners and aluminium heads, he was decidedly of the opinion that much still remains to be learned, and that the good effect of this war would be reflected to an important extent in car and motor cycle engines—particularly of the racing type—after the war. Motor cyclists in the Air Service nowadays look upon twelve-cylinder engines as quite ordinary, whereas formerly even an eight-cylinder power unit was regarded as complicated and almost a bag of tricks. When the use of four valves per cylinder becomes more general (as a matter of fact we have seen five and six valves per cylinder in certain aero engines)—with the multiplicity of cylinders we shall know what complication is—the paramount necessity of good design and the finest workmanship will become apparent.

TEN YEARS AGO.

A CORRESPONDENT in the May 15th number of *The Motor Cycle* in 1907 reveals the fact that opinions were far from being unanimous on the magneto question. He says, in a discussion on the merits of the accumulator, that "he had never yet succeeded in starting up on the magneto, even when the engine was warm." Truly a dreadful state of affairs; but known even in these days of perfect high-tension magnetos. Engines are sometimes as stubborn as mules to start, but we do not blame the magneto (at least only occasionally), or the engine, or carburetter; instead, the stuff we use as fuel gets the credit. True it *was* petrol in those days, ten years ago.

London-Edinburgh Run.

In the London to Edinburgh run of that year, of seventy-three entries twenty-nine were fitted with accumulator ignition and thirty-eight with magneto, and six not stated. There were twenty-five single cylinders, and forty successfully accomplished the run.

What was claimed to be the first lightweight V-type twin-cylinder motor cycle was being produced in Geneva at this time under the name of La Moto-Rêve. Afterwards this machine became fairly popular in this country, in spite of its microscopic parts.

The Gyroscope and the Motor Cycle.

The application of the gyroscope to the motor cycle was thought of quite seriously ten years ago. Quite a stir in the railway engineering world was created by Mr. Louis Brennan, who sought to revolutionise railway practice by the use of a single track, the stability of the train being retained by heavy flywheels revolving in opposite directions. It was claimed by theorists that, if the system were applied to the motor cycle, corners would be taken automatically at exactly the correct angle, and that side-slip would be robbed of its terrors. That some form of side-slip could, of course, occur is certain, but what its nature would be is difficult to say.

THE CAULDRON OF WAR.

A VISIT TO A HOSPITAL FOR WAR-WORN MOTOR CYCLES.

BY the side of a certain railway somewhere in England the careful observer will notice more motor cycles stacked together and exposed to the elements than he has ever seen in his life. He will be interested, of course, and will begin to wonder what they are, why they are there, and what will be their fate. Having heard of the existence of this wonderful collection, we sought for further knowledge, and, having a good friend at court, we asked him for facilities for a closer inspection, and these were readily given. After a long journey we found ourselves at a veritable motor hospital. The enthusiastic engineer suffers a feeling akin to pity when he sees beautiful pieces of mechanism brutally handled, or seemingly irreparably damaged. It is a feeling like that experienced by one who sees human beings or animals ill-treated, and yet there is this great difference. In the hospital for wounded men, the brains of fellow man can never restore the mutilated soldier to his former perfect state, but in the motor hospital the battered machine can be patched up and made as good, or nearly as good, as new.

Stacks of War-battered Machines.

The O.C. and his lieutenant, who had been advised of our coming, showed us round, and, after passing through workshops in which damaged cars and lorries were seen in various stages of overhaul, we passed into an open space in which there were several hundred motor cycles stacked in ranks as close together as possible, and in various states of dilapidation. According to the lieutenant, there were a thousand machines there in all, and a wonderful but somewhat sad sight it was—an example of the terrible wastage of war which could not but appeal to the motor cycle enthusiast. A hasty glance round revealed the fact that the greater portion of the motor cycles and sidecars had been sent to "Blighty" after suffering severe accidents. The number damaged by the enemy was comparatively small. Minor defects may be made good in any field or base repair shop, but here there were only the worst cases. Not a single one of the machines we saw could be wheeled, much less driven, so serious was the damage they had suffered. Could they "talk" what wonderful tales they could tell! Some have crashed into lorries, with what fate to the poor driver the machines alone know; some have been carelessly driven—a misjudgment of speed or distance and a collision with a brick wall may have been their undoing; crashing into shell holes may have sealed the doom of others; while some battered relics have clearly suffered at the hands of the Hun. One has only to quote one paragraph from that part of the interview with Captain Louis Keene, which was reprinted in our issue of May 31st, to be able to guess pretty accurately the fate of the once splendid machines which were ranged before us the other day. "It is probably true that more motor cyclists have been killed so far by the motor lorries of their own armies than by enemy bullets." Captain Keene goes on to explain that if a large motor lorry hits a motor cyclist it usually hurls him fifteen or twenty feet ahead on the road and then runs over him. Can one help wondering, therefore, as to what happened to the riders of these bashed and battered crocks?

Perforated by Shrapnel.

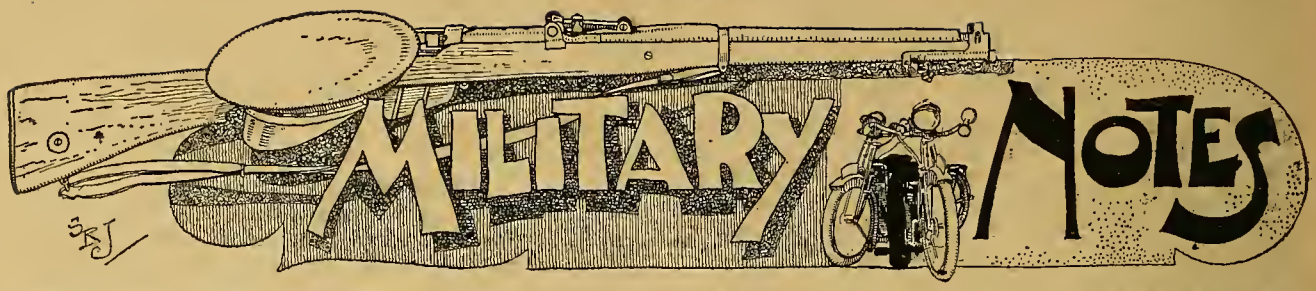
Mentioning that we were particularly interested in motor cycles which had been under enemy fire, the Captain remarked, "Oh! you are keen on motor cycles suffering from shell shock, are you? Well, we can show you a few." And in a very short time the corporal-artificer produced five or six of the finest examples one could hope to see. One can imagine that at the next Show, whenever that may be, manufacturers will be proud to exhibit such samples as these.

Here are a few details of machines hit probably by shrapnel. As most of our readers are aware, this type of shell (the invention of an English colonel who bore the name) contains some 300 bullets, and on bursting projects these bullets fanwise, "watering" the ground in much the same manner as an ordinary garden watering-can scatters its shower of water. The first example was a 4 h.p. Triumph. The cylinder had had the head knocked off and the piston broken. One bullet had gone through the top tube and another had severed the tube completely at the rear. There were several holes through the tank, the front mudguard was riddled, one bullet had gone clean through the front tyre, and the extra mudshield was well peppered. The next we saw was a Douglas. This, likewise, showed bullet holes through the front mudguard and tyre. One of the front fork stays had been cut through, there was a hole clean through the handle-bars, the head was completely smashed by a bullet, and the tank perforated in several places. Another Triumph, besides many other wounds, had the centre of the cylinder cut clean away; only the head and base remained. The silencer extension was also freely punctured. Walking down the ranks we had a brand new Triumph pointed out to us, which had probably met its doom on its very first ride.

Some of the Museum.

Besides the two famous makes mentioned, we noticed 4 h.p. Douglases, numerous sidecars—bodies only, frames only, and complete attachments, many of which appeared to have gone through "end-on" collisions. Rudge-Multis, Scotts, Indians, and Sunbeams were also to be seen. In one rank we noticed a Triumph which had suffered badly from shell-fire. The saddle had been ploughed up by shrapnel, the pulley and cylinder were broken, the tank was perforated, the fork stays were cut away, and the mudguards were riddled, yet this poor wreck, we were told, would be capable of repair. Quite ninety per cent. of these war and weather-worn rusty derelicts, we were informed, would eventually be restored to a state almost like new. The finished articles were to be found at another depot, so we did not see these.

The O.C. and his colleague comforted us somewhat by stating that they thought that most of the machines hit by shell-fire had suffered when standing in the open, and not when being ridden. It was hard to believe that any rider on or near these machines could have escaped with his life.



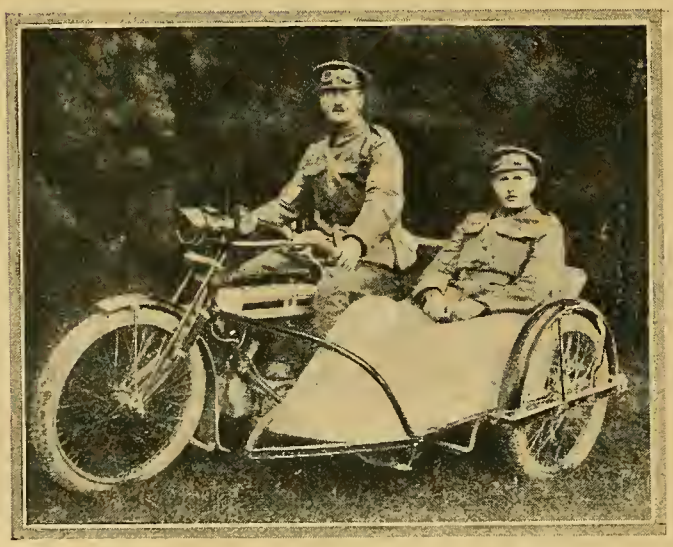
THE NEW "TANKS" FILMED.

THE "Tanks" now in use at the Front are the 1917 model, and were shown at a private view at the Scala Theatre, London, recently, under the direction of the War Office Cinematograph Committee. The "Tanks" have a film to themselves, and one of the newest of these engines, which are now shorn of their trailing steering wheels, is seen crawling past the camera, with an officer standing on its back directing its movements.

"HOME-MADE" SIDECARS.

THE ingenuity of our men in France knows no limit. We have illustrated a sidecar made for the greater part of ordinary boxes, one from bits of crashed aeroplanes, and now Art. Cpl. Watkinson, R.E., crowns all by sending us a photograph of a sidecar of quite pleasing appearance, made from an old tank. Cpl. Watkinson says:

"After seeing so many illustrations of sidecars built on active service I am sending a photograph of one I have built myself 'out here.' The framework of this sidecar was built with T iron, which was found among the ruins of France. The body was built from an old zinc water tank. This combination has done some hundreds of miles out here, and has stood up to its work well, taking into consideration the state of the roads over which it has travelled."



This sidecar was once an old water tank, and was converted by Art. Cpl. Watkinson, R.E., whilst on active service in France. Sgt. Atkinson, R.E., is sitting on the bicycle, with Cpl. Watkinson as passenger.

STACKS OF MOTOR CYCLES.

ELSEWHERE in this issue we publish an interesting article and some attractive photographs of motor bicycles awaiting repair at an M.T. Depot. It may seem curious at first sight why so large a number of machines is stored in the open and exposed to the weather, but when, however, the enormous number of machines is taken into consideration, it will be obvious at once that their storage presents very serious difficulties indeed. It must also be borne in mind that many of these machines may have been lying out in the open Overseas for days before they could be collected, and have probably suffered already as much damage from the weather as they will ever suffer. Many show signs of having been buried, and are covered with mud, which has doubtless worked into every moving part.

ARMY MOTOR CYCLES' DISTINGUISHING BADGES.

WHILE visiting the great M.T. Repair Works, which are dealt with in an article appearing in another part of this issue, we noticed that many of the machines bore distinguishing marks on the number plates or tanks. One Triumph we saw had a check board painted on the tank, another had an artistic form of star painted on the rear number plate, while there seems to be no end to the variety of device used. The officer who showed us round informed us that these did not mean anything particular from a military point of view, but were merely distinguishing marks painted on by the men themselves to enable them to spot their own machines at a glance. This is quite a good idea when one thinks of so many of the Army motor cycles being of the same type that they are practically indistinguishable one from another, especially in the dark, and certainly an improvement on the practice of painting silly names on the tanks.

AN ORIGINAL M.M.G. BATTERY.

ONE of the first recruits in the original motor machine gun battery, recruited by the Editor of *The Motor Cycle*, was H. Hegan of Coventry. He went to France with his battery in the spring of 1915, and a year later was granted a commission in the M.M.G.S. We are reminded that Hegan and some of his friends were afraid that the war might be over before they had an opportunity of a spell in the trenches; not so, however! Instead, Capt. Hegan has been appointed officer commanding the No. 7 Battery. Another member of the original No. 5 Battery now holds a captaincy in the Tanks, *i.e.*, Capt. A. J. Palmer.

Capt. H. Hegan, M.M.G.S., one of the original recruits in the No. 5 "Coventry" battery.

TWO YEARS IN FRANCE.

PTE. W. J. MONTGOMERY, M.T., A.S.C., attached as motor cyclist to a Siege Battery, has been in France since March, 1915. Before the war he was responsible for the design and production of the "Montgomery" 5-6 h.p. flat twin-engined motor cycle on original lines. He competed in all the important competitions during 1914, with the object of testing the "Montgomery" motor cycle before it was placed on the market, and met with encouraging success.

Profiting by his opportunities of experience with motor cycles at the Front, Montgomery has sent home several designs, for which patents have been taken out, viz., spring fork, spring frame, sidecar springing, and spring luggage grid for sidecar.

Pte. W. J. Montgomery, of the Motor Transport, A.S.C.

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

BELT WEAR.

Sir,—"A.J.B.'s" belt was torn in places, not by the chippings of granite, but by the tar itself. I found this out by an accident; I had some non-slip belt compound, and I got one tin confused with the one that had tar in it, and put tar on instead, both being the same in appearance. In less than 150 miles there was no rubber on the sides of the belt at all! I hope this will interest some of your readers.

H. T. MORTHAM.

TWIN ENGINES.

Sir,—We were very interested in the letter over the signature "Sikh," and also in your excellent leading article. We have not entered into the controversy of the flat twin, because we have, for after the war, a 7-9 h.p. V twin *with outside flywheel*, which we venture to hope will secure the approval of the motor cycling public.

Should "Sikh" still require an enthusiast of the V twin with whom to compare notes on his return home, we should be pleased to give him the opportunity.

But why a tour in France? Surely some of the Scottish trial trips would give him quite sufficient data to go on with.

BURNEY AND BLACKBURNE, LTD.
C. E. SYDENHAM.

TWO-STROKE DESIGN.

Sir,—In your issue of May 24th you give a proposed idea of a two-stroke design by Mr. A. C. Hamilton, who claims that its advantages outnumber its disadvantages. In my opinion they do not. The beauty of a two-stroke engine lies in its being valveless; and to start putting a valve on is not adding to its simplicity (particularly an overhead valve). He also claims that his design means simpler piston castings. In place of that he puts awkward cores in the cylinder casting. This interrupts the equal distribution of the air-cooling fins, which is liable to cause a distorted cylinder in case of the engine getting very hot. The design also needs glands in the cylinder head for getting the valve in and out.

B.E.F. — J.W.B.

TWO-STROKE V. FOUR-STROKE.

Sir,—I am writing to endorse every remark made by "Reliability" in your issue for May 31st *re* the four-stroke lightweight.

I myself bought a 2½ h.p. New Imperial-Jap in March of this year, having previously owned a baby two-stroke of good make, and therefore I consider myself in a position to compare their capabilities. As far as I can see, the only point in favour of the two-stroke is "simplicity." As regards speed, reliability, ease of control, general comfort, and easy starting the four-stroke wins hands down.

The fuel economy of the two motors is, I believe, about equal. My two-stroke used to do 100 m.p.g., whereas the J.A.P. only registers about 80 m.p.g. I say the fuel economy is about equal, owing to the fact that the four-stroke will run perfectly on a 50% mixture of petrol and paraffin, whereas the two-stroke would not even "look at it." I intend fitting a vaporiser and hot air intake to my little 'bus, and am quite sure that I shall be able to use neat paraffin, except for starting up with petrol. Have any of your readers experience of the Attwood vaporiser?

Perhaps it would interest you to hear that recently I rode from Henley to Oxford (exactly twenty-three miles) in just under 45m., average 32 m.p.h. This speaks volumes for the little J.A.P., as the country is by no means level.

Finally, I think that the two and four-stroke types of motor bicycles can be very well compared thus: The two-stroke inspires a sneaking feeling of mistrust. The four-stroke inspires confidence. Usual disclaimer.

Oxford. SATISFIED.

AIR PRESSURE IN TYRES.

Sir,—I do not think that your various correspondents on this subject have quite hit the nail on the head, and I therefore venture to put forward my own views.

Board-hard tyres are undoubtedly good for the tyres, but just as certainly bad for the frame and the engine, not to mention the rider's comfort. The vibration caused by hard tyres on bad roads throws tremendous strains on the machine, whereas tyres on the soft side insulate the machine to a very large extent from road shocks. Worn tyres are easily replaced, but worn working parts are a much more costly and difficult matter to put right. In fact, once this deterioration sets in, it is practically impossible to check it effectively.

The introduction of spring frames will probably minimise the damage caused by hard tyres, but in the meantime my vote goes to tyres on the soft side, in the belief that they prolong the life of the machine, and considerably reduce deterioration.

London, S.E. S.K.

A LUDICROUS DERANGEMENT.

Sir,—I have carefully followed "Ixion's" remarks (April 19th) on the peculiar running of a certain 4¼ h.p. machine. I am of opinion, however, that Capt. Lindsay's diagnosis (May 17th) is a trifle far fetched, because a careful examination of the action of the contact breaker would show quite an opposite effect during high speed. Having ridden one of the machines mentioned for two years I appreciate the complaint.

On a continuous tour of 1,200 miles last summer I had ample time and patience to notice the behaviour of my combination, and came to the conclusion that the erratic speed waves were caused by the method of placing inlet and outlet pipes on the silencer. Accordingly I made a few hack-saw slits in the opposite end of the silencer, and found that much back pressure was taken off the piston. However, I decided to have a totally different silencer. Accordingly, I fitted a copper exhaust tube passing from the cylinder, outside the magneto chain case and under the footboard. Just under the countershaft gear case a silencer 4in. diameter by 8in. long was fixed, having at the outlet end a cone protuberance with an ultimate outlet of 1 5/16in. A short outlet pipe 1 5/16in. diameter leading to the fish tail end completes the job.

The results attained are illuminating. I live at the foot of a hill, and prior to the modification of the silencer I had to make the ascent on low gear. Since the change I can comfortably climb the hill on second gear. The fault of the original silencer, in my opinion, is that the inlet pipe immediately overlies the outlet, and thus during the discharge of the gases cuts off to a very appreciable degree the escape of gases from the silencer. Further, the fall in temperature of the gases in the silencer is slight, consequently some means are necessary to overcome molecular agitation of the gases and control their movement.

It is evident from the foregoing criticism that if travelling full speed the machine pulls up (due to pressure of gases in the silencer), and when the back pressure is reduced the machine again makes headway, and so on.

My urgent advice to riders of this type of machine is to change the silencer and pipes to a position producing a constant flow of the gases.

DAVID SHARP.

POWER AND WEIGHT OF SIDECARS.

Sir,—"K.S.D.," in your issue of May 31st, does not entirely agree with my notes in holding up the mediumweight sidecar outfit as the outfit of the future.

It seems to me that "K.S.D." does not quite grasp what I was driving at, but bases his remarks on present experience. He will find no assertion in my article to the effect that the heavyweight sidecar outfit of to-day is not superior to the mediumweight outfit of to-day. The pith of the article was that by development and the employment of modern principles, the outfit which to-day scales as a mediumweight will to-morrow scale as a heavyweight, capable of performing anything that the heavyweight of to-day performs, and of doing it without the tiredness to which "K.S.D." refers. That is, that the makers of outfits should aim at developing the mediumweight till it supersedes the heavyweight, or, if you like, of refining the heavyweight till it becomes a mediumweight.

I certainly think that higher engine efficiency and the springing of all three wheels will have a decided tendency in the direction of lighter sidecar outfits. CHINOOK.

MOTOR CYCLE THIEVES.

Sir,—I would like to give you some information which would help your readers.

Some men recently visited the garage belonging to a friend of mine to sell a 1915 Douglas for £15. This, of course, made the proprietor suspicious; so he said, "Yes, I had one of those the other day," and, still talking, these men said they worked on the "papers" (they drive the cars and motor cycles delivering evening newspapers) and could drive anything. They said, "Kingsway is a good place to find motor cycles and cars."

The plan is to advertise, "Wanted a Harley-Davidson," etc., giving an address at the top of a high building. A motor cyclist leaves his machine outside, and, on returning from the building, finds it gone. So it is advisable to padlock the machine through the front forks. If it is padlocked in the sprocket the engine can be started up and allowed to "rev." when letting in the clutch will break open the padlock.

We have been helping the police, who asked us to go to Greenwich Police Station to see if some men caught were the same fellows. We found they were, and also saw the Douglas which was stolen from a private garage near Lee, E. There seems to be a whole gang about.

We think it would help unfortunate people who innocently buy stolen machines if the trade would put the engine number in every transaction and especially on receipts.

MINNIE TULLY.

THE INCUBUS OF THE SIDECAR.

Sir,—Nothing in *The Motor Cycle* has given me so much pleasure as "Road Rider's" article recently, and what he says has long wanted saying. I rode a Douglas for some years, and the only fault I found with it was that it required decarbonising and generally tuning up rather more frequently than I cared about, probably because I usually rode at a good pace and never spared the engine.

But is there a 3½ h.p. machine to fill the place of the Douglas, especially the T.T. model? Before agreeing to "Road Rider's" enthusiastic tribute to the T.T. Norton or C model A.B.C., it would be necessary to know if either of these machines possesses all the excellent qualities of the T.T. Douglas plus a 500 c.c. engine with its longer period of power maintenance.

The *essential* qualities in a solo mount (all possessed by the T.T. Douglas) are: (1.) Light weight. (2.) A simple and light two-speed gear. (3.) Ease of starting; the paddling off start is a great convenience in traffic, and for practical purposes to a solo rider is equal to a kick starter and clutch without their weight and complication. (4.) Chain-cum-belt drive, with its long life of belt and freedom from slip compared with an all-belt drive, and its cleanliness, lightness, and ease of removal of back wheel as compared with an all-chain drive, which is usually made heavy by the necessity of fitting shock-absorbing devices, and if the chains are enclosed the back wheel is usually difficult to remove and replace.

May I say, in conclusion, that I *have* seen the ideal solo machine. It was at a hill-climb at Princes Risborough about three years ago, and consisted of an ordinary T.T. Douglas with a 500 c.c. A.B.C. engine.

Watford. SOLO.

THE "SCARE" PRESS.

Sir,—With regard to your article in *The Motor Cycle* of May 31st, headed "Petrol and the Press," it seems to me that the most effective way of dealing with the criticisms to which you refer is to treat them with contempt.

The inconsistencies of the same section of the press are, of course, only too well known. Possibly you noticed in a certain contemporary just before Easter an article urging all and sundry not to travel during the holidays, while on the adjoining page was a column headed "Where to go for Easter," with Margate as the place of attraction.

Travelling up to Town recently I saw a copy of the same paper burned by a number of officers on leave, their righteous wrath evoked by some "yelp" respecting the pleasure-seeking motor cyclist and the petrol situation.

Cambridge. LIGHT INFANTRY.

A CURIOUS MAGNETO FAILURE.

Sir,—As one who has had some experience of magnetos, may I make one or two suggestions as to the temporary fault in your correspondent's magneto.

I entirely agree with his remarks as to the excellence of this magneto, but I must add that the unorthodox contact breaker requires some care in adjustment, and I have seen several garage "experts" absolutely bunkered by it. I cannot express myself very technically, neither can I sketch, but I trust Mr. Brownrigg will be able to follow my remarks, which may or may not be a solution to this apparently mysterious failure.

Starting with the first adjustment of the platinum points, I presume he either filed or tapped down the elevation and depression which he says existed. Now if he omitted to bring out the points to the previous gap by adjusting the screws, he allowed the fibre block to come very near touching the bottom part of the cam, which, of course, it should not do, as if it does it will prevent the points from making contact at all. When the block is off the raised or tripping portion of the cam, it should be possible to pass a strip of thin paper under it quite freely.

Obviously after reassembling it was *not* actually touching, as the machine ran for two months, but it was probably "a near thing," and after a trifle of wear on the points and fibre gradually became "a sure thing"; that is to say, a point was reached when the points and block made simultaneous contact (practically impossible) or the block touched first, keeping the platinum points apart altogether.

Now coming to the roadside adjustment, I hope your correspondent will not feel offended if I suggest it was an accidental adjustment. I say this because he does not mention that he touched the adjusting steel disc at the back of the contact breaker. This disc screws on to a boss on the contact breaker, and by screwing up or unscrewing it a trifle the relative positions of the points and the fibre block are immediately affected—as it actually controls the distance the whole breaker can be forced up the taper shaft by means of the centre locking screw.

It is possible that he accidentally turned this ring back (it is easily moved with the fingers) a quarter turn or so, and prevented the contact breaker going up the taper so far, and thereby again giving the block clearance over the lower part of the cam and allowing the points to "make."

Even if he did not touch the adjusting disc it is still possible that he got accidental adjustment by not putting so much weight on the centre screw when putting back the contact breaker, *i.e.*, perhaps he did not get it in the former position by $\frac{1}{100}$in. or so.

These are only suggestions, of course, and are made only with a desire to help your correspondent. I can assure him that I have seen more than one U.H. fail for the reasons given above.

With regard to British magnetos, surely the monopoly enjoyed by the Eisemann, U.H., and Bosch concerns was due to the fact that no British firm cared to tackle these big organisations in competition as regards *price*. No one with any electrical knowledge could have any doubt that these simple electrical machines could have been made just as well by British workmen, especially when they bear in mind the mass of complicated electrical machinery they do turn out (second to none in quality) week by week. When I say that the retail price of a motor cycle U.H. magneto was £3 15s., less a liberal trade discount, you will see my point. A.J.B.

Clevedon, Somerset.

WANTED, A GOOD LIGHTWEIGHT.

Sir,—Can any of your readers advise me as to the best moderate-priced motor cycle to buy for conveyance of self (weight 10 stone) to and from a town ten miles distant, up fairly steep Sussex hills?

At present I have an excellent 3½ h.p. Triumph, but my medical adviser says that, in consequence of an operation sustained three years ago, I must have a really *lightweight* machine.

Pace is not a *sine quâ non* in my case, but reliability is.

W. A. FULLER, M.A.

The College, Storrington, Sussex.

PETROL ECONOMY.

In a recent issue of *The Motor Cycle* "Chinook" writes *re* the exceptional petrol consumption of the two-stroke Velocette.

I should just like to say that I have one of these machines, and just recently rode it from Coventry to Manchester, *viâ* Birmingham and Wolverhampton, on half a gallon of fuel—half petrol and half substitute.

This, to my mind, is really most remarkable, and since this I have done a 100-mile run round Derbyshire (per Cowey trip speedometer attached to my friend's machine) on half a gallon of crude paraffin, climbing all hills on top gear.

These figures seem almost incredible; but, lest I should receive letters in reply questioning these statements, I should like to point out that I have no axe to grind, and do not see any amusement in making exaggerated asscrtions.

I should be glad if I knew the reason why the machine is so light on fuel (my machine is not an exception, as a friend of mine has one which does approximately the same).

Personally, I do not favour "Chinook's" theory that it is due to the oiling system (what a splendid system!), but am rather inclined to believe that a low crank case compression may have a great deal to do with it, combined possibly with port opening and closing positions, dimensions, etc. Do the makers express any opinion, or have they, fortunately, struck everything just about right?

It would be decidedly interesting to hear different opinions of riders of these very interesting machines.

ARTHUR WOOD.

A NOVEL SPARKING PLUG.

Sir,—Will you permit us the opportunity of justifying our letter, which you were good enough to publish in your issue of May 31st? In that letter we corrected a statement appearing in your article to the effect that the insulator of the Anderson plug was quartz. To our letter you appended the following editorial criticism:

"The plug is novel, inasmuch as it has apparently never been seen by motor cyclists in this country previous to its use on the Indian demonstration machines. The insulation may not be quartz, but it is a substitute which will stand much more heat than glass, and in America is known as 'Quartz Insulation.'"

We repeat that the insulation is not quartz but glass, and glass only. It is described as glass in Anderson's 1903 patent specification; it is marked glass on Messrs. Anderson's catalogue illustrations, and the plug is described as the 'glass and steel plug' in all Messrs. Anderson's advertisements. Neither quartz nor anything of the nature of quartz could be adapted to the purpose. In making any statement to you for publication we invariably confine ourselves to facts.

As to its claim to novelty, it does not follow that because the makers of Indian cycles have just adopted it it is necessarily new. Apart from the above-mentioned fact, that it was patented in 1903, it has been illustrated from time to time in English motor journals—the most recent of which illustrations upon our files being dated 1914.

The pre-war American price of the plug in question was $1.50 (say, 6s. 3d. in English value). We do not in any way wish to detract from the merits of the plug in question; we are perfectly content to leave this to the judgment of users, but any English manufacturer of repute would welcome the opportunity of putting up a plug in competition with the model in question at about half the price. We certainly think it unfair to stigmatise other makes as "unsuitable" or "unsatisfactory" when they have had no opportunity of comparative trial.

THE SPHINX MANUFACTURING CO.

UNEQUAL LUBRICATION OF V TWINS.

Sir,—I should feel extremely obliged if some reader would kindly inform me of any satisfactory method of equalising the lubrication of the cylinders of a V twin engine. I have an 8 h.p. twin J.A.P., and all the oil passes by a Best and Lloyd sight feed drip to the base of the front cylinder. The piston of this cylinder consequently laps the oil off this oil hole, and the surplus returns to the crank case and lubricates the rear cylinder. One would think that under these circumstances the front cylinder would be over-lubricated, but whenever the cylinders are dismantled for cleaning an excessive amount of deposit is always noticeable in the rear one.

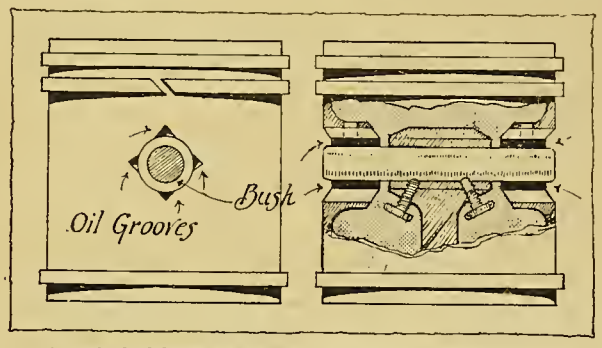
I have also a water-cooled V twin of 10 h.p. on which the lubricating arrangement is similar, and the result is just the same. I have closed up the baffle at the base of the rear cylinder and opened up the other one. The result was no better.

Any hints would be appreciated by HUMBERETTE.

Dublin.

GUDGEON PIN FIXING.

Sir,—Referring to the article on gudgeon pins, published in *The Motor Cycle* of May 24th, I should like to state that for the past nine months I have been experimenting with a gudgeon pin fixed in the connecting rod, and found it quite satisfactory in every way. It will be noticed in the sketch that the piston is bushed in the usual way at either side, and has four oil grooves in the sides. The gudgeon pin is fixed in the connecting rod by two set screws running into the gudgeon pin.

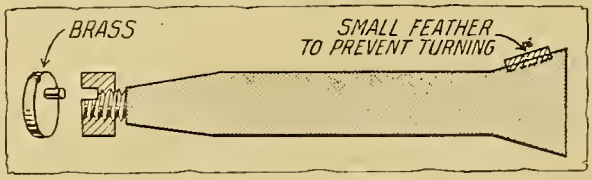


A method of fixing the gudgeon pin which is claimed to give increased wearing qualities.

I might mention that out here at times we find a great difficulty in getting replacements, and on an average, after a machine has been in use for nine months, the play between the gudgeon pin and piston is excessive. Being unable to get a piston at the time, I tried the above idea, and it has been working for nine months quite satisfactorily in every way, and has required no attention.

B.E.F. N. SMITH (Government Artificer).

Sir,—I read with interest the articles on spring frames; for being a South African I know what bad roads are, and realise what spring frames would mean, even at the cost of additional weight. I would like to know why the British



Gudgeon pin fixing adopted by W. Hammond.

manufacturer cannot adopt the Indian method of spring frame, for undoubtedly the springing is excellent both front and rear. Is it because the Indian people hold the patent rights? With regard to the gudgeon pin fixing, the enclosed sketch shows how I remedied a loose gudgeon pin on a 1911 Humber. I may say I am a mechanic and had all the necessary tools. I think that for the small extra cost it is worth while.

W. HAMMOND.

WHY NOT THREE CYLINDERS?

The Pros and Cons for Motor Cycle Practice. By an Italian Motor Cyclist.

THREE-CYLINDER engines were used on motor cars in the past, and are still on the American market for use in gasolene launches. Some slow-speed oil-burning engines of the semi-Diesel type also have three cylinders. As a power unit for automobiles they were either superseded by four-cylinder engines or became "grown-up" in the shape of six-cylinder outfits. Incidentally this consideration on the evolution of the "three-lunger" shows that the practice of grouping the cylinders of six-cylinder engines in pairs is wrong.

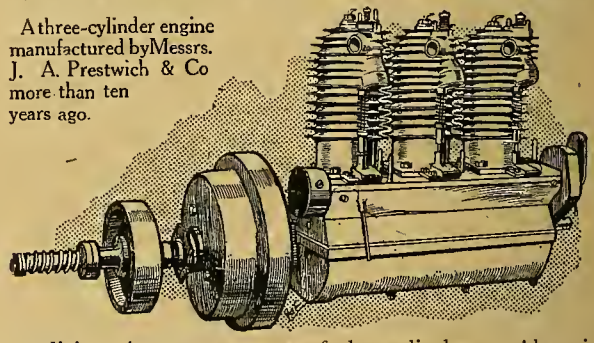
It will be remembered that the aeroplane which first bore Blériot across the Channel had a three-cylinder air-cooled Anzani engine, with a.i. valves, and with the cylinders disposed radially on the top half of the crank case, 60° apart. To-day, the great majority of flying machines and airships, not excluding the "Zepps," have either six or twelve-cylinder engines, both, of course, evolved from the simpler three-cylinder.

There are upon the market motor cycles possessing engines with one, two, or four cylinders, but the three-cylinder engine seems to be conspicuous by its absence at the present time, though not unheard of in the past. The Dennell motor cycle, built in 1906 (a photograph of which we reproduce on this page), is an excellent example of what might be done in this respect. This machine is fitted with a J.A.P. engine (also illustrated) rated at 8 h.p.; its frame shows considerable merit from more points than one. The gear is 4 to 1 through a worm drive in the countershaft and a double belt to the rear.

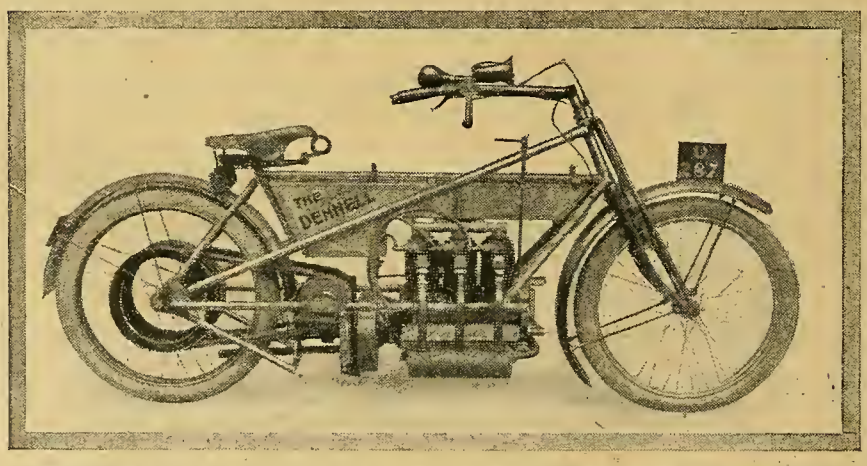
Four Cylinders Wanted, but—

Motor cycle designers looked around for something better than the V twin and built the flat twin, which is theoretically perfect, but which seems to have some slight drawbacks in practice, judging at least from riders' experiences as described in these columns. The four-cylinder engine seems to be what is really wanted: moreover, it has been advocated by an experienced writer; and yet it is significant that even those firms which also build cars and light cars, with the exception of the F.N., have not brought out a four-cylinder motor cycle, though possessing ample experience and constructional facilities for building it. From this one would infer that some difficulty is encountered in making, or in selling, or using a vehicle of this type.

Possibly the greatest weakness in the Henderson, in the ill-fated F.N., the air-cooled T.M.C., and the late Arrow (the selling of which has for some years past been discontinued by the Pierce-Arrow Motor Car Co., of America), is and was inefficient cooling. After all, what can one expect when all cylinders have the same amount of cooling surface and each occupies a hotter place than the one immediately in front? The case of the V and flat twin is different. Surely this is a gross error both in theory and in practice. Either water-cooling or gradually deepening fins are necessary. The latter alternative is carried ont more easily with three than with four cylinders. In either case, a *monobloc* casting might be used to advantage, as it would help in equalising the temperature of the cylinders. Also, in building such an engine, no experimental work would be entailed, save perhaps in finding ont in what proportion to increase the cooling surface of the cylinders in air-cooled engines. In other details standard four and six-cylinder practice would be followed throughout.



A three-cylinder engine manufactured by Messrs. J. A. Prestwich & Co more than ten years ago.



The Dennell motor cycle of 1906 had a three-cylinder J.A.P. engine, the clutch being placed in the flywheel. An open worm gear conveyed the drive from flywheel to countershaft.

The Advantages of the "Three."

With regard to its merits, it is to be noted that the "three-lunger" can claim over the *best* type of twin-cylinder, *i.e.*, the flat twin, at least all the advantages that the "six" has over the "four" (viz., greater flexibility, acceleration, and absence of vibration), *plus* the fact that it is shorter than a flat twin and no longer than a V twin of the same cubic capacity and bore-stroke ratio.

A third advantage is the possibility of using that most efficient

Why not Three Cylinders?

form of transmission, shaft drive, and worm gearing. The fourth point of superiority over the twins now fitted to motor cycles is the convenience of being able to use direct drive on top speed instead of driving first to a countershaft.

As compared with the four-cylinder power unit, the three-cylinder vertical is cheaper and shorter, owing to the smaller number of cylinders, and, as has been said, is easier to air-cool. But—and this is important—it can actually claim over the four-cylinder an improvement on the point of balance, this, of course, being due not to the number of cylinders, but to the relative position of the cranks (120°). Incidentally, some readers may recollect that this was the chief reason why ten years ago Rolls-Royce, Ltd., decided, after exhaustive tests, that six cylinders were better than eight. Surely this is conclusive, and ought to be a strong point in favour of three-cylinder motor cycle engines, because, while length, flexibility, acceleration, and cost of manufacture may decrease slightly in various proportions, as compared with the four-cylinder engine, vibration is no worse, possibly even better.

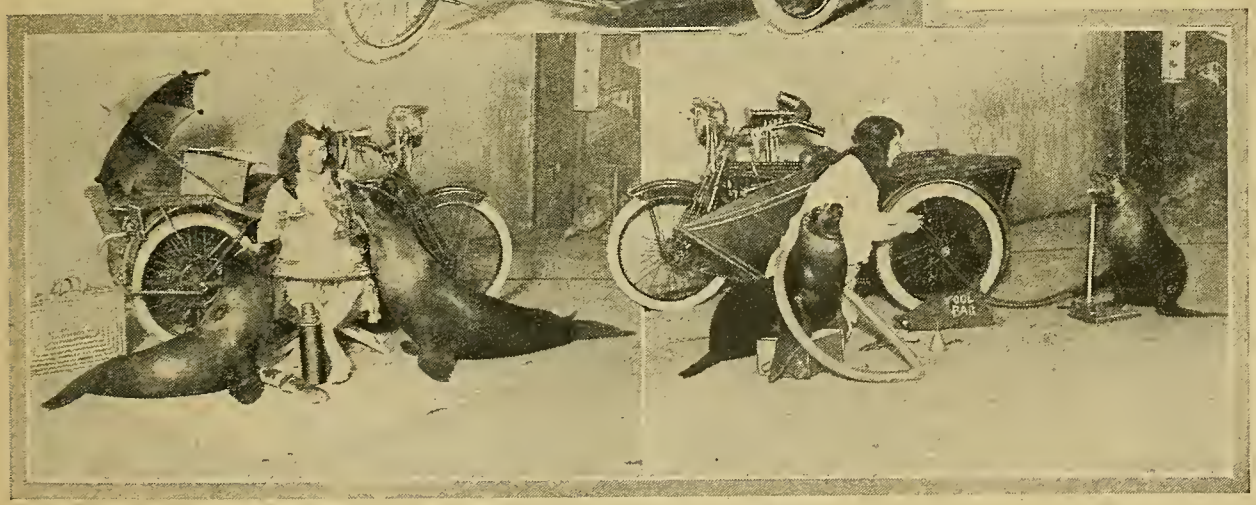
I am sure the possibilities of a three-cylinder vertical-engined motor cycle might with advantage be investigated by some designers, more particularly those who are also car builders. If correctly made, a three-cylinder power unit could well replace the vertical twin as found on the smaller light cars. V.C.

National Motor Volunteers in U.S.A.

Patriotic Activity on the Part of American Clubs.

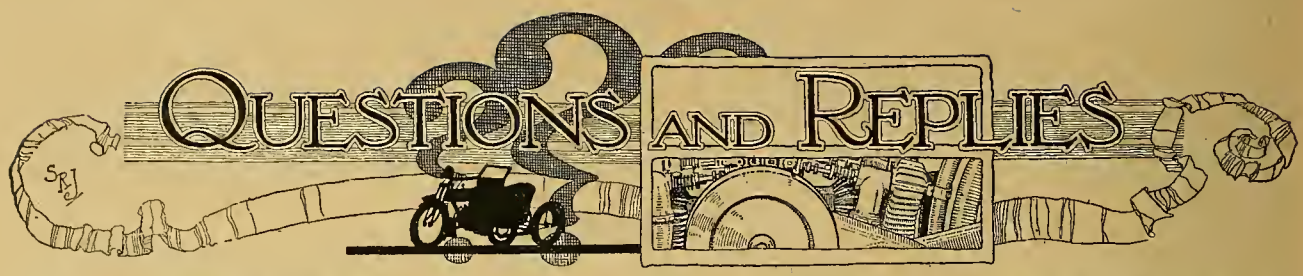
OUR American contemporary, *Motor Cycling and Bicycling*, is urging men to join the Volunteer Motor Transport, the object of which is to assist the War Department by the immediate formation of as many voluntary motor truck, motor car, and motor cycle companies as possible in all the States, and particularly along the Atlantic, Gulf, and Pacific Coasts, as a measure of preparedness for any emergency that may arise.

Military motor cycle companies have been formed in Portland, Oregon, Tucson, Arizona, Wheeling, Boston, W. Virginia, Massachusetts, Savannah, Pittsburg, Baltimore, California, and many other cities and States. In order to provide motor cycles for members who wished to join, Portland enthusiasts interested the business men and Chamber of Commerce in circulating subscription lists, by which means funds were raised to purchase the necessary machines for those not owning them. Men joining under this section are assured that they will not be separated from their mounts.



MOTOR CYCLING SEA LIONS.

We have already seen the motor cycling chimpanzee on the stage, but one would hardly have anticipated seeing a sea lion taking part in a similar performance. Petite Nina, however, has trained a pair of these animals to perform amusingly and intelligently on a P. and M. sidecar, and the degree of intelligence they exhibit is really remarkable. At a signal, one will engage the clutch and steer the sidecar round the stage. In the right hand photograph one is seen busy with the tyre pump, while the other appears to be waiting for the solution to dry. Picnics are their great delight! Petite Nina will be at Chiswick Empire on June 18th, and Stratford Empire on June 25th.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Removing a Flywheel.

I should be extremely obliged if you could put me up to a dodge in removing the flywheel of my Velocette two-stroke. There is no end play whatever in the shaft, or I would get a wedge made to drive between the sprocket and crank case. I have been to the expense of having a flywheel drawer made, thinking it could not fail to remove the wheel, as it exerts a tremendous force, but it will not do the trick. Could you also tell me whether plain or ball bearings are used in this engine?—H.V.H.

Squirt paraffin round the joint, and leave for an hour or so. Jam wooden blocks on either side between flywheel (or sprocket) and crank case, then fix your flywheel drawer in position, and tighten up. Give the nut of flywheel drawer a sharp blow with a mallet, and the flywheel should spring off. All the bearings are plain in the Velocette engine.

Vaporising Paraffin.

(I.) In using paraffin as a fuel, is it advisable to heat the paraffin ere it reaches the float chamber? (2.) Would the heat upset the working of the carburetter by expansion of the fine working parts or otherwise? (3.) Is the compression of an average four-stroke sufficiently reliable to fire the charge solely by compression? What are the maximum pressures in the cylinder?—C.S.

(1.) There is an advantage to be gained in heating paraffin in the float chamber in that vaporisation is very much assisted thereby. It should not, however, be heated above its flashpoint, say about 80° F., or vapour will be given off, causing "air" lock, and upsetting the steady working of the carburetter. If, moreover, the paraffin is made too hot, it will show an increased tendency to "creep," running over the carburetter externally and collecting dirt. The best plan would be to heat the paraffin between the float chamber and the jet.

(2.) There would be no danger whatever of the heat interfering with the working parts of the carburetter. The expansion of the metal parts would be infinitesimal.

(3.) No; the compression of an average compression engine is probably between 40 to 70 lb., in accordance with the throttle opening, which is not high enough to fire the charge Diesel fashion. The explosion pressure will not exceed 300 lb.

Using a Pulley Gear as a Clutch.

I have a 1911 3½ h.p. Triumph (fixed gear). Would you recommend me a pulley gear which would act as a clutch as well as a gear, as I want to use a sidecar occasionally, and I do not want to part with the machine, as it is in very good trim?—A.J.

A variable pulley, though it has its limitations, is quite satisfactory as a gear, but it is impracticable to use it as a clutch, on account of the strain on the belt being too great and causing rapid wear of both belt and pulley. You might, for example, fit a governor pulley with great advantage, but then you would require a plate clutch in the hub. Epicyclic engine-shaft gears are usually quite satisfactory.

Drilling an Engine.

I have a 4-5 h.p. Bat-Jap, and I wish to tune it for racing. I am going to drill the pistons and connecting rods so as to lighten them. I have a book on tuning, and see that it says certain places on the piston should be avoided when drilling on account of the stresses which occur there. Could you tell me: (1.) Where these stresses occur? (2.) How many holes and of what diameter do you recommend drilling? (3.) Would a machine so lightened be suitable for ordinary touring, or would the pistons and connecting rods be liable to break easily? (4.) On what part of the piston do you recommend drilling the holes? (5.) Will you name one or two books dealing with tuning motor cycle engines? (6.) Given a two-stroke and four-stroke of the same horse-power, which consumes the more petrol?—N.V.

Drilling an engine to obtain lightness is rather a ticklish task for the amateur, and we would not advise you to overdo it. (1 and 2.) There are practically no stresses in the skirt of the piston; but if it be too freely drilled you will experience trouble by too much oil round the rings. The more you reduce the weight of a piston the worse will become the balance, unless the flywheels be rebalanced, which is not a simple undertaking. Suppose you start off with seven or eight ⅜in. holes round the piston skirt. (3.) We would not advise you to drill the connecting rod. The drilling should not interfere in any way with the suitability of the machine for touring. (4.) The skirt only. (5.) "Motor Cycles and How to Manage Them" and "Hints and Tips for Motor Cyclists." In the former you will find an excellent article on engine balancing. (6.) As a rule, a four-stroke engine is a good deal more economical than a two-stroke of the same cubic capacity, this being mainly due to the overflow of unburnt gas through the exhaust port of the latter, together, of course, with the double number of explosions.

Claiming Damages.

A friend of mine, while riding my motor cycle, had the misfortune to be run over by a heavy motor lorry, and is now in hospital suffering from his injuries. I am in doubt as to how I should proceed. (1.) Would you tell me the best method of procedure? The police have full particulars, and the machine was not insured. (2.) Should I claim for my machine separately, or should my friend claim for both his injuries and my machine?—B.R.J.

Your friend should claim damages, both for his personal injuries and for the damage to the machine, from the owners of the motor lorry. It is best to write a courteous letter first of all, and if a satisfactory reply is not obtained get a solicitor to send a letter. If you are a member of the Auto Cycle Union, or any similar institution, and bring this matter before them, they will give you free legal advice, or take up the case for a very moderate fee.

Magneto Lighting.

I have a lighting set comprising three four-volt lamps, the current being supplied from two Fuller block accumulators. (1.) Is it possible to supply current from magneto? If so, where should I make connections to a Bosch magneto? (2.) When running during the day, would it be possible to recharge accumulators? (3.) Would it be better to have three two-volt lamps and the accumulators connected in parallel?—A.G.M.

(1.) This would be possible, but we should certainly not recommend you to attempt it. Special provision in the way of a choking coil, etc., would be necessary, and we doubt whether you would obtain satisfactory results. (2.) No; it is impossible to recharge accumulators from the magneto. (3.) By employing three two-volt lamps in parallel you would use less current, and the parallel system has advantages over the series system in the respect that if one lamp fails the circuit through the two remaining lamps is not broken. You will not, of course, obtain anything like so good a light.

Insufficient Silencing.

[?] I was riding a 1911 Standard Triumph motor cycle on the Longford Road, Bedworth, recently, when I was stopped by a policeman, who stated that I was riding with my cut-out open (which was not so). I received a summons to appear at the Court, and was fined 12s. 6d. for riding a motor cycle and using a cut-out. I should like to know if this fine can be enforced. I was not even aware that it was an offence to use a cut-out.—J.H.

We are of opinion that your only course is to pay the fine. If your machine were noisy you would be liable to a fine even if you were not using a cut-out.

Overhead Valves.

[?] Recently I had occasion to take the route Newcastle to Hawick over Cater Bar—quite a good road so far as gradients are concerned, long steady rises and easy bends. My mount was a 6 h.p. twin, in perfect condition. The wind was a fairly strong following one. The machine was not quite powerful enough to do the long gradients (1-14 to 1-20) on top, so, of course, I had to do miles on second, 9 to 1 (about). The consequence was overheating, in spite of extra oil, etc. In fact, the engine got so hot that it refused, had to stand and cool, then went ahead first-class again. I maintain that if I could have kept on top I should have created a sufficient air draught to have kept the engine cool enough. After a good deal of thought, I decided to invest in the most powerful machine (combination) I could get, and thought a 7-9 h.p. Harley-Davidson would suit, as, like a good many other people, I have an objection to dropping into low gears. But both the Harley-Davidson and the Sunbeam combination have overhead valves, which one of your correspondents says are unsuitable for touring. If so, I am not going to be a great deal better off. I want to be able to take a sidecar up most main road hills on top, given fair conditions. (1.) Do you think the Harley-Davidson would do what I want, as it is the only machine I can get new of that power? (2.) Is the letter by Mr. K. V. Chidley, in your issue of May 31st, a correct opinion? Are overhead valves a drawback for steady hard work?—E.W.

(1.) We certainly think that the Harley-Davidson would climb anything within reason on its high gear if properly ridden. It would very seldom prove necessary to change down so long as the way was open. Your present machine would be more satisfactory if a slightly lower gear ratio were fitted. (2.) We think the letter to which you refer is sound, but you must not confuse the overhead valve system (that is, both valves overhead) with the single inlet valve overhead, Sunbeam and Harley-Davidson system. The inlet valve overhead is an excellent system for sidecar engines, but the complete overhead system is more for speed. It requires more attention than the side-by-side or overhead inlet valve systems, and is not cut out for hard pulling at low speeds.

READER'S REPLY.

Overheating.

I saw in your issue of May 24th a question by "C.L." on the lubrication of his 3 h.p. twin—I take it to be an Enfield. I am myself an Enfield owner, and so think I know what is his trouble. If "C.L." drain out all the oil from both his crank case and glass cylinder, and put in new, fairly thin, oil, I think he will be able to get his exhaust to smoke as much as he wants to.—D.K.

RECOMMENDED ROUTES.

MARGATE TO MARLOW.—J.M.R.

Margate, Sarre, Canterbury, Charing, Maidstone, Wrotham Heath, Borough Green, Riverhead, Westerham, Godstone, Redhill, Reigate, Dorking, Leatherhead, Cobham, Chertsey, Egham, Windsor, Maidenhead, Marlow.

DERBY TO BLACKPOOL.—T.J.B.

Derby, Ashbourne, Leek, Congleton, Northwich, Warrington, Newton-le-Willows, Ashton-in-Makerfield, Wigan, Preston, Lytham, Blackpool. Approximately 110 miles.

SWAFFHAM TO ANSTEY (LEICS.).—A.E.H.T.

Swaffham, Downham Market, Wisbech, Guyhirne, Peterborough, Wansford, Uppingham, Leicester, Anstey.

STOKE-ON-TRENT TO SWANSEA.—L.D.

Stoke-on-Trent, Newcastle-under-Lyme, Market Drayton, Hodnet, Shrewsbury, Church Stretton, Ludlow, Leominster, Willersley, Hay, Three Cocks, Brecon, Merthyr Tydvil, Neath, Swansea.

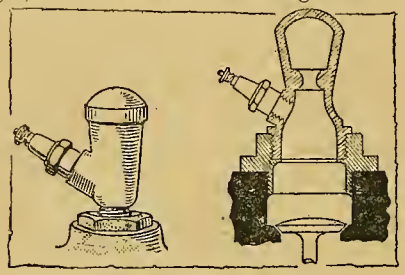
LONDON (HAMMERSMITH) TO GLASGOW.—G.D.W.

Hammersmith, Shepherd's Bush, Ladbroke Grove, and then due north to Kensal Rise Station, where turn left up West Lane on to the Finchley Road, and continue through Finchley, Barnet, Hatfield, Welwyn, Stevenage, Baldock, Biggleswade, Eaton Socon, Buckden, Alconbury Hill, Norman Cross, Wansford, Stamford, Grantham, Newark, Tuxford, Retford, Bawtry, Doncaster, Ferrybridge, Aberford, Wetherby, Boroughbridge, Leeming Lane, Scotch Corner, Barnard Castle, Middleton-in-Teesdale, Alston, Brampton, Longtown, Gretna Green, Ecclefechan, Lockerbie, Beattock, Crawford, Abington, Lesmahagow, Hamilton, Glasgow. Approximately 410 miles.

An Army Service Corps (M.T.) officer piloting a 4 h.p. Triumph-Gloria sidecar combination up a 1 in 3 grass bank. Many of these outfits are now used by the Royal Flying Corps.

TO PREVENT KONKING.

IN internal combustion engines there is a liability to konking when using cheap fuels, or when the compression has become excessive owing to carbon deposit. The object of a recent invention (No. 105,657) by Mr. C. Binks, Eccles, is to relieve this liability. A bulb, or tube, is screwed into the valve cap or sparking plug hole, which is shaped with a narrow neck and a large space above. The upper chamber is said to remain more or less filled with exploded gas, and this has a cushioning effect at

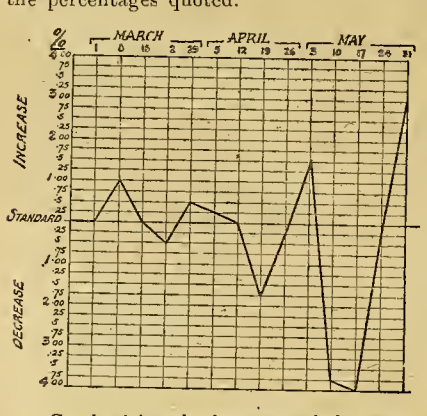


The Binks anti-konking device.

the beginning of the explosion stroke and thus prevents the knocking which would otherwise take place at this moment. The plug, of course, must be screwed in below the neck, where fresh gas is plentiful.

FLUCTUATIONS IN SECOND-HAND PRICES.

MR. F. E. PARKER, of Old Charlton, who sends us the accompanying interesting graph showing the fluctuations of the second-hand motor cycle market, writes as follows: "The percentages quoted on the graph are based on the weekly averages contained in *The Motor Cycle* issued from March 1st, to May 31st, 1917, and during this setting of the graph I have noticed that the two-strokes, four-strokes, and heavy combinations have fluctuated week by week almost proportionately, that an £88 combination which has fluctuated between £76 and £100 is equal in proportion to a light-weight fluctuating from £21, £24, or £27. Although I have included Auto-wheels in my calculations, they represent only a very small decimal fraction per cent., and are, therefore, practically exclusive from the percentages quoted."



Graph giving the increase and decrease in the average price of second-hand motor cycles from March 1st to May 31st.

AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average. The word "combination" indicates a sidecar outfit as supplied complete by the makers.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C.	1914	3½ 2-speed	—	£40
A.J.S.	1916	6 combination	£97	£96
„	1914	6 combination	£58	£56
„	1916	4 combination	—	£85
Allon	1916	2¾ 2-speed	£30	£33
„	1914	2¾ 2-speed	—	£28
Ariel	1915	3½ 3-speed	—	£45
„	1914	5-6 combination	£50	£52
Bat	1914	6 3-speed	—	£48
Bradbury	1914	4 2-sp. sidecar	—	£43
Brough	1916	3½ 2-speed	£55	£58
„	1915	3½ 2-speed	£46	£45
B.S.A.	1916	4½ sidecar	£60	£57
„	1915	4½ sidecar	—	£56
Calthorpe	1916	2½ 2-speed	—	£34
„	1915	2⅝ 2-speed	£22	£25
„	1916	2½ 2-stroke	—	£29
Clyno	1915	2½ 2-stroke	—	£27
„	1914	6 combination	£65	£65
Connaught	1915	2⅜ 2-stroke	£35	£24
Douglas	1916	2¼ 2-speed	£46	£50
„	1915	2⅜ 2-speed	£42	£42
„	1914	2⅜ 2-speed	£33	£34
Enfield	1916	6 combination	£80	£83
„	1915	6 combination	—	£63
„	1916	3 2-speed	£48	£43
Excelsior	1915	8 2-speed	—	£48
H.-Davidson	1916	7 combination	£82	£79
„	1915	7 combination	£63	£67
Henderson	1916	7 combination	—	£100
Hazlewood	1914	6 3-speed	—	£39
Humber	1915	6 combination	—	£69
Indian	1916	5 combination	£65	£57
„	1916	7-9 combination	—	£77
„	1915	7-9 combination	£68	£61
James	1916	4¼ combination	£78	£65
„	1916	2-sp., 2-stroke	£28	£33
Lea-Francis	1916	3½ 3-sp. sidecar	£67	—
Levis	1916	2¾ Popular	—	£25
„	1915	2¾ Popular	—	£22
Matchless	1915	7 combination	—	£70
New Hudson	1916	2-stroke, 2-speed	—	£28
„	1915	4 combination	—	£48
New Imperial	1916	2½ 2-speed	£31	£31
„	1915	2½ 2-speed	£24	£25
Norton	1916	3½ 2-speed	—	£52
„	1915	3½ T.T.	£44	£45
O.K.	1916	2¾ 2-stroke	£19	£22
P. & M.	1915	3½ combination	—	£65
„	1914	3½ combination	£50	£53
Premier	1915	2½ 3-speed	—	£28
„	1914	3½ 3-speed	—	£45
Rover	1916	3½ 3-speed	£52	£51
Royal Ruby	1916	2⅜ 2-stroke	—	£25
Rudge	1916	3½ Multi	£45	£45
„	1915	3½ Multi	£38	£40
Scott	1916	3⅜ combination	—	£60
Sun	1915	2¼ 2-speed	—	£23
Sunbeam	1916	8 combination	—	£103
„	1916	3½ solo	£72	£72
„	1915	3½ combination	£80	£80
Triumph	1916	2-speed, 2-stroke	—	£36
„	1915	4 countershaft	—	£55
Velocette	1915	2¾ 2-sp. 2-stroke	—	£25
Zenith	1915	8 Gradua	£63	£62

DELAYS IN POSTAL DELIVERIES.

In view of depleted staffs, the curtailment of railway services, and the consequent delay in delivery of mails, readers will greatly assist by forwarding communications (including advertisements) as much as possible in advance of the dates of the issues for which they are intended.

SPARKLETS

New Address.

Thomson-Bennett Magnetos, Ltd., inform us that they have now moved to their new works at Great King Street, Birmingham.

Lubrication.

We have received an interesting and instructive pamphlet from Messrs. Price's Co., Ltd., dealing with the absorbing subject of lubrication when paraffin or other petrol substitute is used. Much sound information is given, and the pamphlet, which takes only a few minutes to read, is thoroughly worth perusal.

Addresses Wanted.

It is really remarkable that so many would-be purchasers omit to send their addresses when writing to advertisers. The latest examples of this lapse of memory have been sent to us by Messrs. F.R.S. Lamps, who also complain that strangers to the firm constantly request the despatch of goods without forwarding any remittance.

Palmer Map Book.

Among the many hundreds of enquiries that have been received for the new Palmer Map Book during the past few weeks, quite a number of correspondents enclosed stamps of varying amounts to cover postage. As the Palmer Map Book is advertised as being sent free, so long as the supply lasts these map books will be sent free and post free; there is no need whatever to send stamps.

Catalogue Received.

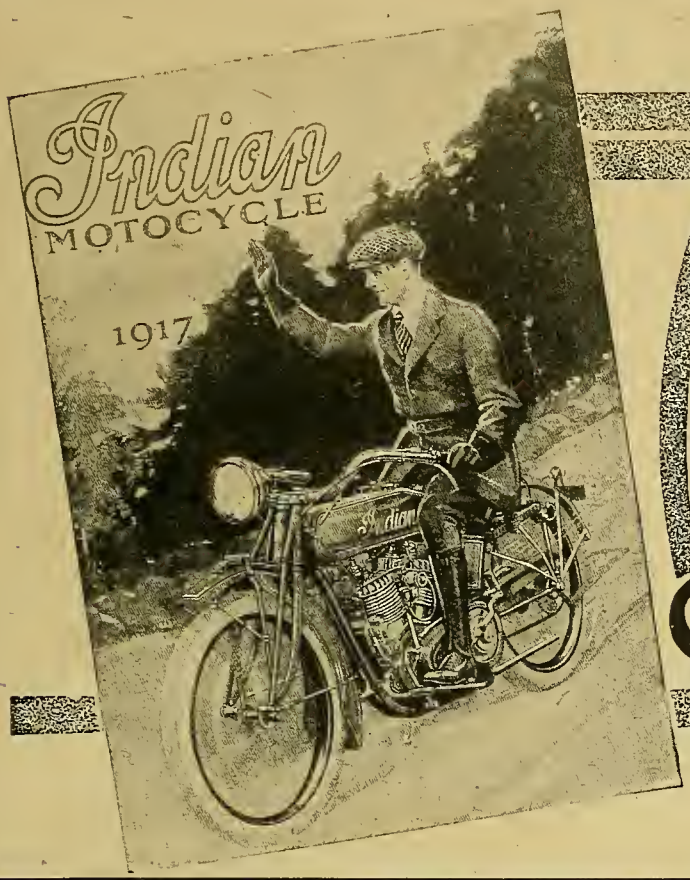
We are in receipt of the latest catalogue of Forward sparking plugs, and other accessories, which include box spanners for sparking plugs, various types of Forward belt fasteners, Forward leather-covered belt links, also punches and valve stem adjusters. Forward plugs are sold by the Forward Motor Company, Summer Row, Birmingham.

Daimler Adoption of Aluminium Pistons.

We are informed that the Daimler Co. have recently placed an order for 1,500 Magnalite aluminium alloy pistons, the selection being the result of an extensive series of trials over the last two years. This may appeal to many as strong evidence in favour of the aluminium piston, the Daimler Co. being, of course, among the foremost and most progressive petrol engine manufacturers in the world.

Route Map of Inner London.

The R.A.C. Official Large Scale Route Map of Inner London. (George Phillip and Son, 32, Fleet Street, London, E.C.; paper 1s. 6d., cloth 3s.) A remarkably clear map showing practically every street in the Metropolis, with the main roads marked in pink. The routes recommended for the avoidance of traffic are marked in brown, this being of particular value to the motor cyclist.



"Count the Indians on the road."

HENDEE MFG. CO.,
"INDIAN HOUSE,"
366-368, EUSTON ROAD, LONDON, N.W.
Telephone—Museum 1643.
Telegrams—"Hendian, Eusroad, London."
AUSTRALIA—
109-113, Russell Street, Melbourne.
CANADIAN WORKS—
12-14, Mercer Street, Toronto.

Indian

AFRICA—
Indian House, 127-9, Commissioner Street, Johannesburg.
Indian House, 579, West Street, Durban.
Indian House, Strand Street, Port Elizabeth.

PLAYER'S
"COUNTRY LIFE"
Cigarettes
(MEDIUM STRENGTH)
Pure Virginia Tobacco

10 for 4½D.
50 for 1/10

These cigarettes are also supplied at Duty Free Rates for the purpose of gratuitous distribution to wounded Soldiers and Sailors in Hospital. Terms and particulars on application to—

JOHN PLAYER & SONS
Nottingham.

Branch of the Imperial Tobacco Co. (of Great Britain and Ireland), Ltd
P.653

Regimental Uniforms:
Indian Army, Imperial Cadet Corps.

Bowden Wire Ltd.
London
Victoria Road, Willesden Junction, N.W.10.

BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.

TRADE MARK

Godbolds

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed ——— & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

☞ DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

ABINGDON King Dick, 3½h.p., 2-speed, free engine, £26; sidecar to fit, £5/10, bargain.—17, Goldhawk Rd., Shepherd's Bush, London. [3888

A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305

RIDER TROWARD'S, 78, High St., Hampstead.—A.J.S., 1914, 6h.p., 3-speed, hand clutch, kick-start; 42 gns. [3837

A.J.S. Combination, in exceptional condition, 6h.p. twin, fully equipped; £55.—Percy and Co., 337, Euston Rd., London. [3564

A.J.S., 6h.p., 1913, and smart cane sidecar, 3 speeds, kick starter and handle-bar clutch, in splendid running order; £42/10.—See below.

A.J.S., 6h.p., 1914, 3 speeds, K.S., and clutch, perfect throughout, also C.B. sidecar with same, requires renovating; price £47/10.—Sanders' Depot, Bridge St., Hitchin. Tel.: 91. [3865

A.J.S. 1916 6h.p. Combination, done 200 miles, new condition; accept £90, no offers.—Watson, Holley Terrace, Stanley, S.O., Durham. [X1186

A.J.S., 1915, 4h.p. twin, 3-speed, hand and foot controlled clutch, new tyres, complete with lamps and Klaxhorn, in splendid condition; £58.—N. Walker, 17, George St., Hull. [3646

How helpless you are

if the fastener fails!

Has it ever struck you how much depends on the selection of one that is really dependable?

Fit FORWARD Fasteners —they never fail.

The one shown below is the FORWARD, the strongest on the market. Price 1/6.

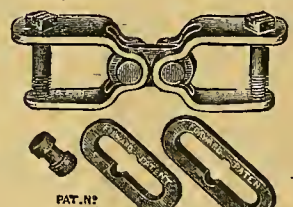
Other models in our range are:—

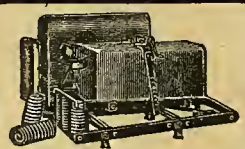
THE KING HOOK
Detachable 1/-
Adjustable... ... ... 1/3

THE CHAMPION
Detachable ... ... 9d.
Adjustable... ... ... 1/-

Ask for new Catalogue.

FORWARD MOTOR Co.,
35, Forward Works, Summer Row, Birmingham.





TAN SAD
(Trade Mark)
ADJUSTABLE SEAT & PETROL CARRIER
13 Models to suit all requirements.
Send for list & particulars.
TAN SAD WORKS
F. H. HEADLEY, 5a, Parker St., Birmingham.

'Hints and Tips for Motor Cyclists.'
Brimful of useful information.
Price 1/6 By post 1/8
Home or abroad.
ILIFFE & SONS LTD., 20, Tudor St., E.C.4.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

2¾h.p. A.J.S., 1915 model, 3-speed gear, free engine clutch, Lucas lamps and horn, splendid condition and running order; £45; guaranteed.—Wauchope's, 9, Shoe Lane, London. [3880

A.J.S., 1915, 3-speed, clutch, T.T. bars, P. and H. head lamps, generator, rear lamp, tools, sound tyres, machine perfect throughout; £43/10.—Advertiser, 156, Ot. Portland St., W.1. [2869

1916 4h.p. A.J.S., 3-speed, chain drive, h.b.c. clutch, semi T.T. bars, 2 Lucas lamps, guinea Lucas horn, with coachbuilt sidecar complete; £77.—Robinson's Garage, Green St., Cambridge. [3804

GENUINE 1913-14 6h.p. A.J.S. Combination, countershaft, clutch, kick starter, speedometer, lamp, spares, perfect order, good tyres; £40; after 6 p.m.—G., 24, Tudor Gardens, White Hart Lane, Barnes. [3927

A.J.S. Powerful 3-speed Combination, 6h.p. twin, Swan sidecar, kick starter, B. and B. s.a. carburetter, 70 m.p.g., combined hand and foot clutch, hood, screen, speedometer, lamps, etc., perfect running order; owner must sell; accept £56; would consider good solo mount part exchange.—Frisby, c/o Young, 2, The Parade, Kilburn, N.W. [3870

Alldays.

RIDER TROWARD'S, 78, High St., Hampstead.—1916 Allon, 2-speed; 29 gns. [3839

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [X0796

ALLONS From Stock.—New 2-speed models, £42 each, cash; easy terms or exchange.—Wauchope's, 9, Shoe Lane, London. [3873

1915 2¾h.p. Allon, single speed, new condition, spares, 11 months' insurance, some petrol; £30.—73, Victoria Rd., Stroud Green, N.4. [3680

ALLDAYS Allon, 2-stroke, 1917, cost £41 recently, complete with lamps, horn, spares, etc., as new; £34.—7, Wandsworth Bridge Rd., Fulham. [3656

ALLDAYS Allon, 2-speed, £45/3; single speed, £38/14; 2-speed and clutch, £48/7/6; exchange or extended payments.—Service Co., 292, High Holborn, London. [3598

ALLON, 2-stroke, 2¾h.p.; cash £38/14; extended payments; deposit £7/14 and 12 equal monthly payments of £2/13.—Harrods Stores, Ltd., Motor Cycle Dept., Brompton Rd., London, S.W. [3901

Antoine.

3½h.p. Antoine, good running order; £15.—F. Sewell, Long Melford. [3754

Ariel.

ARIEL, 3½h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [2562

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

ARIEL, 5-6h.p. Rex 1911 twin engine, m.o.i.v., Senspray, Bosch, Kerry clutch, T.T. bars; £15, or near.—Haslett, 106, High St., Bexley. [X1187

IMMEDIATE Delivery of 1917 new 3½h.p. Ariels, 3-speed countershaft, free engine, and kick start models, £72, cash, easy terms, or exchange.—Wauchope's, 9, Shoe Lane, London. [3874

Auto-Wheels.

AUTO-WHEEL and Bike, with Druid spring forks, latest pattern.—138, Church Rd., Battersea. [3786

AUTO-WHEEL, in very good condition; £7/10, or exchange for lady's cycles to value.—Box L3,814, c/o *The Motor Cycle*. [3676

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

Advertising and Publishing Offices:
20, Tudor Street, London, E.C.4.
Telegrams: "Cyclist, Fleet, London."
Telephone: 2848 City (five lines).

Editorial Offices:
Hertford Street, Coventry.
Telegrams: "Motorcycle, Coventry."
Telephone: 10 Coventry (five lines).

Northern Offices:
199, Deansgate, Manchester.
Telegrams: "Iliffe, Manchester."
Telephone: 620 City.

Subscription Rates: Home, 10s. 10d.; all countries abroad, 15s. 2d. per annum.

COLONIAL AND FOREIGN AGENTS:
UNITED STATES—The International News Agency, New York. CANADA—Toronto News Co., Ltd., Toronto; Montreal News Co., Ltd., Montreal; Winnipeg News Co., Winnipeg; British Columbia News Co., Vancouver; Gordon & Gotch, Ltd., 132, Bay Street, Toronto.
AUSTRALIA—Gordon & Gotch, Ltd., Melbourne (Victoria), Sydney (N.S.W.), Brisbane (Queensland), Adelaide (S.A.), Perth (W.A.), and Launceston (Tasmania).
NEW ZEALAND—Gordon & Gotch, Ltd., Wellington, Auckland, Christchurch, and Dunedin. INDIA—A. H. Wheeler & Co., Bombay, Allahabad, and Calcutta.
SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

Aluminium Cylinders.

AGAIN we revert to the use of aluminium alloy in air-cooled engines. We are moved to do so, as we are not at all convinced that we have yet succeeded in impressing motor cycle manufacturers with the immense possibilities of the alternative uses of aluminium in cylinder construction. Indeed, from enquiries and investigations, we found nothing more than lukewarm interest in this important subject. One reason may be that aluminium is at present three times more costly than it was prior to the war, but there is every reason to hope that the normal level will be regained when peace is declared.

The fact that nearly all the most successful aero engines have aluminium in one form or another embodied in the cylinder design should alone tempt the motor cycle manufacturer to investigate the subject.

Three most attractive items about aluminium, from the point of view of the motor cycle, are its lightness, high heat conductivity, and facility of machining. We need not dwell upon the need of light weight in a motor cycle. Concerning the second point, cool running is all important, for valve troubles are still all too frequent—and they are mainly due to excessive heat—and cylinder removals, too, in consequence of the rapid formation of carbon, are annoying. Aluminium should help to cure these troubles.

With a view to directing further attention to aluminium alloy cylinders (we have already dealt with aluminium pistons), we publish in this issue an article reviewing possible alternative methods of using aluminium in air-cooled cylinders. Both manufacturer and user will, we feel sure, be well repaid for a careful study of the possibilities presented by the different designs illustrated.

We have already expressed our conviction that, after the war, we shall see air-cooled engines composed entirely of aluminium but for a thin steel or cast iron liner, not merely for racing, but also for touring work. The several advantages offered are so obvious that we feel there is no risk in making such a forecast.

The Age for Driving Licences.

CONSIDERABLE interest has been displayed in the case heard first of all about eight weeks ago, in which a boy under seventeen years of age was proceeded against for driving a motor cycle and sidecar. As may be remembered, a fine of 10s. was imposed because it was held that the motor cycle and sidecar was a car within the meaning of the Act, and the boy had no right to drive it even though he possessed a "motor car" licence. The whole affair seems to have been a most extraordinary muddle throughout.

As is well known, the boy was perfectly within his rights in driving the motor cycle and sidecar if he were over the age of fourteen years.

When the case first came up the defending solicitor was apparently unaware that a licence for driving a motor cycle may be granted to a person over the age of fourteen years, so it seems that the boy was fined, not for having an improper licence, but for driving a class of vehicle which, for this particular purpose, the magistrates wrongly defined. It is, therefore, apparent that the defence was inadequate and the prosecution incorrect, and what might have been a valuable test case is now completely useless. The next stage of the proceedings is that the boy has been advised by the Auto Cycle Union to take out a proper licence and invite prosecution (for driving a "motor car"), and when such prosecution comes about, if it does, the Auto Cycle Union will defend the case free of charge, treating it as a test case. We are told that the boy is driving the machine daily in the vicinity of his home, but the police have not as yet interfered with him. We are further informed that the fine of 10s. has not as yet been enforced.

An index to the advertisements in this issue will be found on the page facing the back cover.

A RUN ROUND SUNDON WAY.

A PICTURESQUE RUN WITHIN EASY REACH OF LONDON.

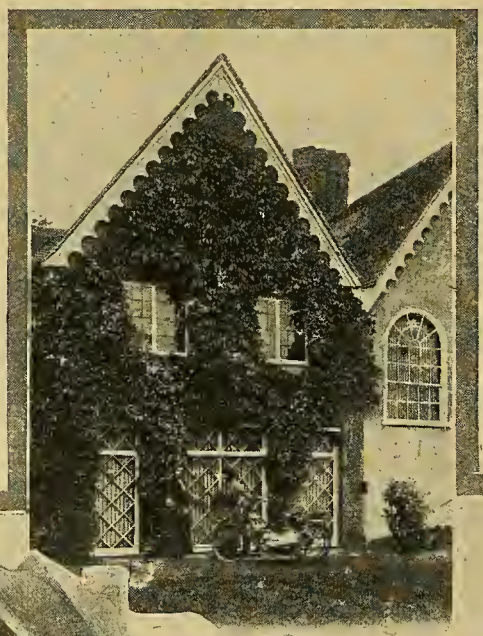
By MAY WALKER.

A PLEASURABLE half-day trip within an hour and a half's run from Town is to the range of hills known as the Barton, in Bedfordshire. This district will well repay a visit when the motor cyclist is undecided where to go on a free afternoon.

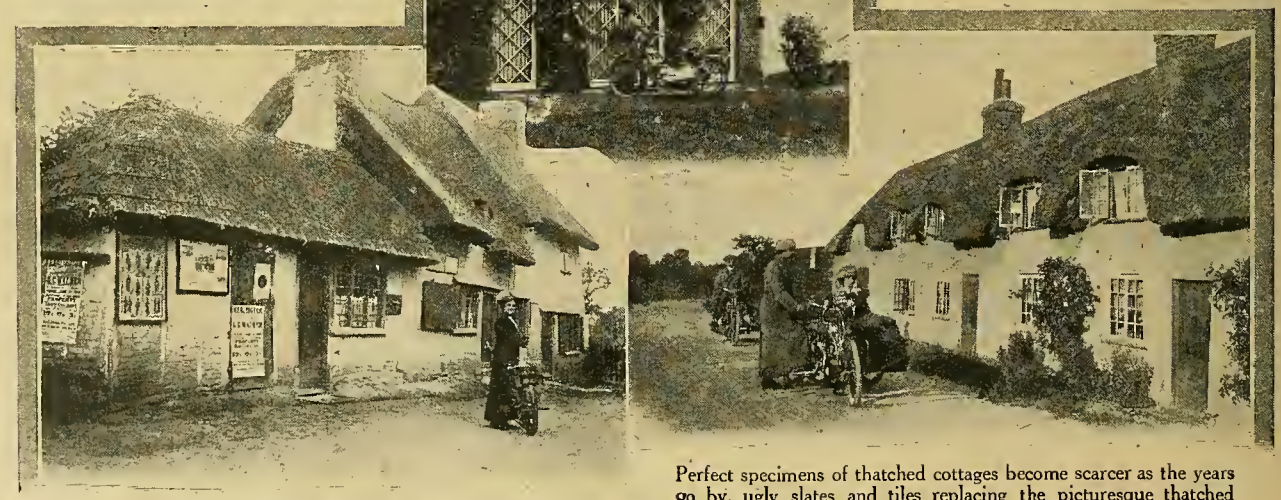
Follow the route to the straw hat manufacturing town of Luton, Barton is but seven miles farther on along a good road. The ascent to the summit of the Barton Hills is so gradual and unnoticeable that even to a push cyclist the long downward slope of the cutting must come as a delightful surprise. The imposing chalk downs are an offshoot from the Chilterns, and have various local names. Coming to a standstill to survey the countryside one is impressed by the profusion of colour given by the array of wild flowers and foliage which cover the hillsides. Here, indeed, must be a happy hunting ground for botanists and entomologists, although it is perhaps out of place to mention such peaceful pursuits in a technical journal devoted to a sport of an active nature; but even motor cyclists can enjoy a ramble by the Barton springs, and possibly the very varied collection of wild flowers growing near by will woo their minds for a few moments from the contemplation of man's handiwork in the form of the motor bicycle.

Turning to the left one leaves Barton-in-the-Clay to follow a road by the foot of the hills to Sharpenhoe Clappers, a noble rounded knoll surmounted by fir trees. Here by the side of the Clappers is Streatley Hill. In the early days of motor cycling this was used as a test hill by the old London club members, and therefore brings recollections of many keen contests. From Sharpenhoe it is but a short distance to Harlington, a picturesque village of thatched cottages well known to Bunyan enthusiasts. Quite recently a scholarly gentleman went to immense trouble to destroy a village tradition that John Bunyan preached from a fine old oak tree, and endeavoured to prove that the true spot was now only marked by a puny hawthorn bush. Some ignorance really is bliss, for the oak tree had its pulpit and rostrum, and was so beautifully situated in a natural amphitheatre that even slightly imaginative people could repicture the scene. The old manor house is authentically connected with the aforementioned historic personage, being the house in which he was lodged prior to being removed to the old Bedford gaol.

Harlington Manor, where John Bunyan was lodged prior to being removed to Bedford Gaol.



Within a mile of Harlington is Sundon Hill, often included in the trials of the Sundon local club, and many a rider has here met his Waterloo on the double bend, with its steep gradient. Near this spot stands a small mound which is claimed to be the highest point in Bedfordshire.



Perfect specimens of thatched cottages become scarcer as the years go by, ugly slates and tiles replacing the picturesque thatched roofs. The cottage on the left is the Harlington Post Office, those on the right are situated on the Barton Road.

Na Poo!

I CANNOT get into the proper mood for talking petrol to-day. I am sitting in a garden of roses; I wear white flannels; the air is heavy with perfumes of the first summer flowers. Around us are maidens in cool white dresses. There is cider cup in a large bowl. How can I, and why should I, turn my thoughts to nasty greasy things like motor cycles, which distil burning heat and radiate foul smells?

[We apologise for our contributor, and propose to make up his column with some paragraphs which we have in stock.—ED.]

Gudgeon Pin Fixing.

SO far as I know, no motor cycle engine adopts the very simple and successful method of fixing the gudgeon pin employed on at least one famous British car engine. The piston is recessed below its compression rings; in this recess is cut a circumferential groove, in which lies a split spring steel ring, engaging with slots cut across the ends of the tapered gudgeon pin. As the ring is well clear of the cylinder walls, it has no stresses to bear, and is as reliable as a key ring. The idea is an improvement on the commoner plan of using one of the brittle cast iron compression rings in a similar way.

The Sport of Kings.

WHEN England is wiser the word "sport" will undoubtedly be relieved of all its false horsey associations from polo to the Derby, from the Pytchley Hunt to a Galloway meet. Horses perspire. Bookmakers usually have red faces and raucous voices. Anybody can ride, if he can afford to be taught and to keep a horse. To become a motor cyclist you must possess a curious innate gift, and be born one of the elect. Take to-day, for instance. It is a sweltering hot day in June. Some fools, bearing all the outward lineaments of human beings, are loitering with flappers in tennis pavilions, or toying with ices and strawberries. They call themselves "sportsmen." My neighbour, Larkins, has jobbed a hack from the local livery stables, and is riding. He will cover perhaps ten miles at an average speed of about four miles an hour. He has been careful to select a mount which does not shy. He will not go off the road for fear it should tread in a rabbit-hole. He wears breeches with white leather inside the thigh and gaiters like a mahogany mirror. Everybody knows he is a sportsman. Even my wife secretly admires him, and wishes I would sell my Norton and buy a chestnut mare. I am out on the open road—at least I soon shall be. My thighs gripping the trusty tank of a Brooklands Norton. The zephyrs fanning my bronzed cheeks. My sinewy frame clad in an aged suit of rather oily Burberry (burnt a trifle in the right calf by the valve chest). I am doing 60 m.p.h. My neck is in permanent peril, but I am afraid of nothing, of nobody. Not of side-slip; not of a burst tyre; not of the police; but I am not a sportsman. I am simply a vulgar fellow; a petrol hoarder; a public nuisance; the scandal of Hawthorn Terrace; a horrible example on whom wives base curtain lectures.

We will change all that, and motor cycling is the sport of kings. *A bas les chevaux!*

The Four-split Electrode.

I AM rather surprised to hear a reader praising the Bosch plug with the heavy central electrode split into four ends. I have used a good many of these plugs, and always found that sooner or later the split ends broke off and fell into the engine. Sometimes they did no harm, sometimes the fragments got under a valve face just before it shut down on the seating, and bent it. In any case, they are prone to overheat and pre-ignite on the modern high efficiency engine, and, generally speaking, they were never a patch on the famous Bosch single point. I hope that any British maker who fancies a multiple-point plug will employ a more sensible method of construction. Its strongest point was the fact that the metal was continuous from sparking point to outer terminal thread, so that the conduction of heat was better than when the points are riveted or otherwise have a dead point at their bases.

The Sportsman's Gear.

NOBODY has come forward to recommend the light two-speed gear suited to the needs of a very light, fast machine. One or two readers champion the Philipson pulley, but it does not quite meet the case. It would, no doubt, enable the speed merchant to climb any English main road hill, but the sportsman's ambition soars a little higher than that. He wants to be able to do his sixty or more on the road: to own a light, handy machine, which will be generally docile, and to be able to accompany parties up freak hills, yea, even from Tornapress to Applecross. On the other hand, he refuses to disfigure his pet speedster by lumbering it up with anything heavy or cumbrous. In fact, the friend who inspired my original appeal wants a gear which will enable his 6 h.p. single-geared T.T. Bat to go anywhere, and yet remain in other respects pretty much what it is at present, and he avers that there are hundreds of riders with the same tastes, even if most of them are Overseas at the moment.

GOODS MADE IN GERMANY.

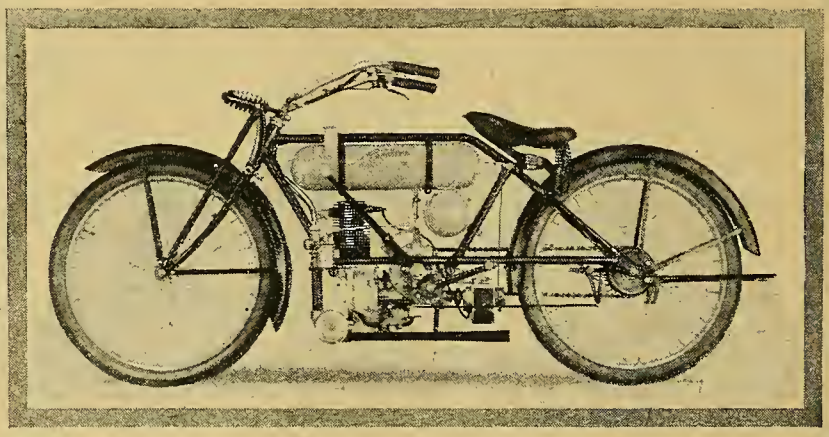
The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

THE CLEVELAND TWO-STROKE.

An American Lightweight Design, in which the Engine, Gear Box, and Magneto comprise a Single Unit.

UNTIL quite recently American manufacturers were somewhat behind the times with regard to the development of two-stroke lightweights, but there now appear on the American market one or two of these machines which are unquestionably worthy of notice. One which embodies several commendable European features, at the same time displaying distinct originality in lay-out, is the Cleveland, a reference to which appeared in this journal some little time ago.



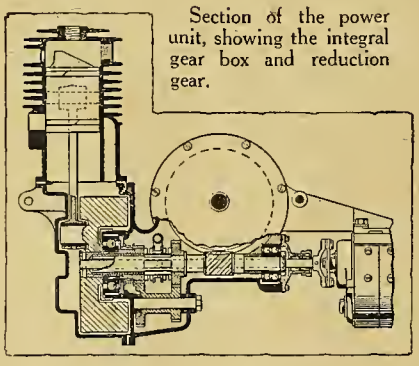
The Cleveland two-stroke lightweight. The engine, gear box, and magneto can be removed in unit from the frame.

The Cleveland lightweight embodies many bold points of design which cannot help but appeal to practical designers. The aim of the makers has been to produce a motor cycle in which the engine, gear box, magneto, etc., compose one unit, which can be removed bodily from the frame and replaced as such—a system which for some years past has received the attention of British manufacturers.

Power Unit and Transmission.

The power unit of the Cleveland is distinct from standard practice in that the flywheel is enclosed, while the crank pin takes the form of a boss protruding from the face of the flywheel, and supported at one end only. The engine is set at right angles across the frame.

The transmission is a compromise between shaft and chain drive, and while some of the advantages of the shaft drive are obtained, the difficulties entailed by the use of a long cardan shaft to the rear wheel, requiring special thrust bearings, etc., are removed by employing a low speed chain for the final drive.



Section of the power unit, showing the integral gear box and reduction gear.

The accompanying sectional illustration of the unit calls for little explanation. It will be seen that engine torque is delivered direct by a hollow shaft to a worm gear, giving the necessary reduction in ratio, and housed in an integral casing directly above the load shaft. Between the worm gear and the engine the gear box is placed, so that, with the gear in neutral position, the portion of the load shaft carrying the driving worm is free to rotate independently of the engine. The entire mechanism is lubricated from the engine.

General Lay-out. A Criticism.

Through the hollow shaft runs the magneto driving shaft, which is integral with the flywheel, the magneto occupying an inverted position at the end of the complete unit. This, indeed, is the only point we are tempted to criticise. Though the neatness of the system is attractive, it would seem to us that the magneto occupies a very exposed position, while an inspection of the contact breaker would apparently necessitate the use of a mirror. The magneto control lever is situated under the saddle, which is not an accessible position.

Outside the casing which encloses the large crown wheel, and on the shaft of the crown wheel, is mounted the chain sprocket for the final drive. This sprocket runs at road wheel speed—a system which should tend towards longevity of the chain, the rollers of which are exposed to less wear than in the case of a geared-down final drive.

It will be observed that the load shaft is supported on ball bearings, while gear changing is effected by the employment of a sliding dog.

The crown wheel is mounted on plain bearings, and since it runs only at road wheel speed, no special provision is necessary for its lubrication. At the centre of this wheel the change-speed gear is pivoted.

Frame Design.

The frame is perhaps worthy of note. It will be observed that the spring forks embody Triumph principles, while the design of the main frame is such that the power unit, complete with its integral units, is merely suspended from two eye-pieces placed respectively at the lower apices of the triangular frame structures. The makers claim that by this system the frame, which is unusually light, is subjected to no intermediate bending stresses, with the result that the machine is practically vibrationless. Very similar systems of lightweight construction have, of course, been experimented with in England by various leading firms, but for some reason the British rider does not appear to have taken favourably to the integral unit system. Time will, however, probably see its further development.

ALUMINIUM AND AIR-COOLING.

The Advantages and Disadvantages of the Metal in the Construction of Air-cooled Engines. Some Suggested Designs.

By GEORGES FUNCK, A.M.I.A.E.

THE use of aluminium in engine construction is daily receiving more and more attention. The progress of the present aluminium offensive, launched against practically any part hitherto accepted as being almost perfect from the point of view of material selection, will undoubtedly have a considerable effect on articles produced after the war. This applies particularly to engine construction for aeroplane, car, or motor cycle use.

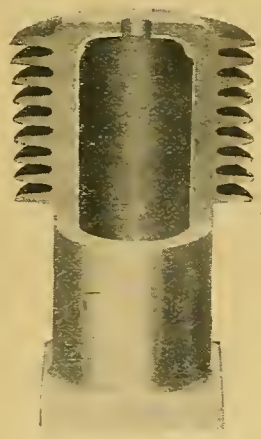
The main advantages of aluminium and its alloys are:

1. Lightness.
2. High heat conductivity.
3. Facility of casting (low melting temperature; possibility of permanent moulds).
4. Facility of machining.

To these main advantages have to be added some minor qualities, like the non-corrosive property against many acids, the slow oxidising, the electric conductivity, the non-magnetic property, and the property of taking easily a high grade polish.

Against these good qualities may be placed certain disadvantages:

1. Small tensile strength.
2. Lack of ductility of most of the cast alloys.
3. Great coefficient of expansion.
4. Relatively soft nature.



A cylinder of aluminium alloy, having a thin cast-iron liner, provisionally protected by a motor cyclist in 1914.

Conduction of Heat.

If we bear in mind the various qualities and properties of the metal in its various alloys we can easily decide where we might use it with advantage. The extreme lightness of the metal was its first asset, and it is this quality which hastened its use in engine construction. Next to this, but only comparatively recently, the high heat conductivity has been more considered, and this has played an important part in deciding its use for piston construction. Following on the success achieved in this direction its utility has also been studied in the direction of cylinder construction both in view of the lightness and heat conductivity of the metal, or solely in view of improving the cooling of the cylinders.

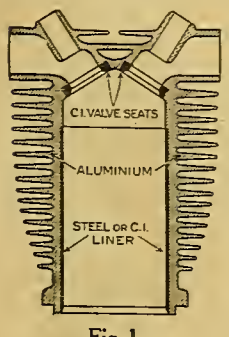


Fig. 1.

It is the object of the present notes to deal with the possibilities of aluminium for use in cylinder construction, but complete novelty is not claimed for all these ideas. In motor cycle practice air-cooling is almost universally adopted on account of its simplicity and low weight, and it is distinctly in the direction of air-cooling that the assistance of the high conductivity of aluminium is most welcomed.

It is, however, a question if the cooling may not after all have been overdone by introducing some hyper-efficiency cooling devices. Although much has to be said for water-cooling and against air-cooling, it has been proved time after time that, taking otherwise identical engines, those adapted for water-cooling show a considerable power loss as compared with those of the air-cooled variety. This being so, it may be argued that a cylinder and engine intended for water-cooling should not be, as stated, otherwise identical with the air-cooled companion, *i.e.*, the compression has to be varied or the timing readjusted and so on, until at the end of experimenting the water-cooled engine would score above the air-cooled one, and be certainly more reliable.

The construction of an aluminium cylinder is illustrated in fig. 1, the object of the construction being obviously lightness and good cooling effect. A thin liner is introduced into that portion of the cylinder which comes into contact with the piston, and the valve seats are cast in the form of separate rings. The liner may be pressed into the aluminium body, or may also, like the valve seats, be fixed into place while casting the cylinder. Curiously enough, this construction was proposed some three years back for motor cycle use, and had been protected by Mr. H. H. Wardle, of Coventry, who tested the system on his motor cycle. It was discovered during the search of patents that the use of a metal of high heat conductivity in conjunction with a cylinder had already been patented. The photograph reproduced shows actually a sample casting made in 1914 at the Reliance Foundry, Coventry, and the line section clearly shows the method of construction.

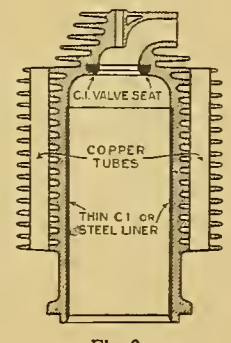


Fig. 2.

Aluminium and Air-cooling.

Fig. 2 illustrates a cooling method still further improved by the introduction of vertical copper tubes into the aluminium fins. This has been proposed on many occasions, but more particularly in the case of cast iron fins. It is an open question whether the use of an aluminium cylinder, combined with copper tubes, is not overdoing the cooling somewhat to the detriment of efficiency.

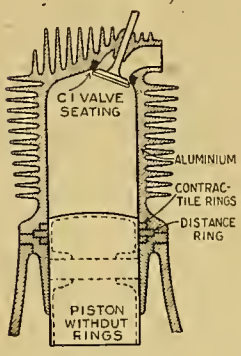


Fig. 3.

There are some disadvantages atributed to this method of construction. Objections are made that the thin liner is likely to be distorted on account of the variable expansion of the two metals; the same remarks apply to the valve seatings. Furthermore, the fear has been expressed that the liner might work loose. Against this the theory has been advanced that, as the liner becomes hotter than the surrounding aluminium, there is a certain compensating effect which takes place. However, so long as there is an unprotected portion of the aluminium cylinder, viz., the combustion chamber, this compensating effect can certainly not take place near the top end of the liner. The holding-down method of such a cylinder must be of sound design, and carefully fitted on account of the metal strength. The same applies to all threaded portions of the cylinder unless special liners are inserted. In spite of these disadvantages the cylinders are very successful if properly handled.

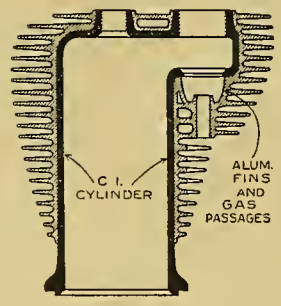


Fig. 5.

Aluminium Cylinder without a Liner.

Fig. 3 illustrates the patented design of an aluminium cylinder without a liner. For this purpose the piston rings are lodged in the cylinder walls, and are of the contractile variety. The advantage of this system is that an extremely light piston can be used, and there is less fear of distortion of the cylinder bore. Also, the piston ring friction can be reduced to a minimum by letting the ends butt after they are properly bedded in, producing a good gas-tight joint. Otherwise it has all the disadvantages connected with the previous designs, and, in addition, will require more careful machining and fitting on account of its aligning up with the bottom loose sleeve.

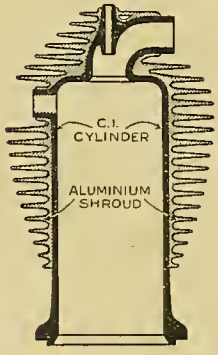


Fig. 4.

Obviously the preceding designs have been intended for aero engine work, as they require very skilful handling and fitting, and are somewhat costly in production and upkeep on account of the care to be taken with them; but they certainly serve the purpose of weight saving, so important for these engines. In the hands of a novice their disadvantages would be more pronounced. For motor cycles a more foolproof design is required. They should be of such a construction that any novice can deal with them without any fear of distortion, scoring, or breakage in dismantling and assembling, more often done for the sake of curiosity than from necessity. It may be remarked that, although these designs are intended for aero engine work, they cannot be applied to rotary engines on account of the centrifugal action of the rotating mass and small tensile strength of the aluminium alloy.

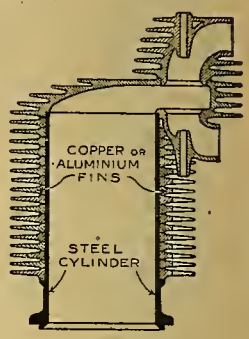


Fig. 6.

Aluminium Fins on Steel or Cast Iron Cylinders.

If, however, the importance of small engine weight is of a secondary nature, another method for improving the cooling may be employed with marked advantages. This consists of using the aluminium alloy purely and simply to improve the radiating qualities of cylinders of the present-day construction by replacing the cast iron or steel fins, as the case may be, by fins of higher heat conductivity. This was done some years back by Mr. F. W. Lanchester, who used separate fins (copper) which were pressed on the cylinder. Although the results obtained were very successful, the cost of manufacture was too great. It will be seen that this method also limits the variety of designs. The cylinders must present an unobstructed barrel devoid of bosses so as to permit the slipping on of the circular fins. Fig. 6 illustrates the application of the method to a cylinder of the A.B.C. type. It will be seen that the head and exhaust valve branch cannot be treated alike in a simple commercial manner.

To overcome this difficulty a recently protected process has been devised. It consists of producing a cylinder of cast iron or steel almost complete with all essentials, as valve pockets, nuts, ports, sparking plugs, bosses, and the like, but deprived of its fins. This cylinder is placed as a core in a mould, and fins of aluminium alloy are cast round it. Figs. 4 and 5 illustrate the result of the casting. It will easily be understood that almost any design is suitable for this process.

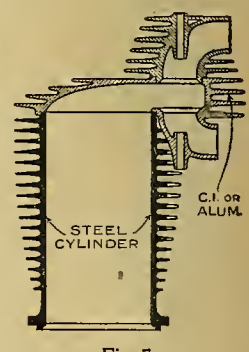


Fig. 7.

However, to produce a simple mould the gas passages are cast integral with the radiating fins. This will render it possible to machine the cylinder all over if desirable before applying the fins. The function of the aluminium alloy in this process is essentially that of assisting the cooling, while the body of the cylinder remains intact and of a stronger material than aluminium.

The advantages are that all the important parts of the cylinder—like screw-threaded apertures, valve seats, cylinder flanges, etc.—are on the cylinder

Aluminium and Air-cooling.—

body, made of the harder material, and the handling of such a cylinder does not require any more skill and attention than an all cast iron construction. The machining is rendered easier, and can be applied outside, too. The cylinder would be almost finished before "finning," reducing the scrap due to broken fins; also broken fins could easily be repaired by "refinning" the cylinder completely. The cost of manufacture is low, as a permanent mould may be employed for the finning process, and it is easy to produce a cast iron cylinder free from faults. Existing cylinders can be treated in the same manner if the old fins be first removed. The cooling of such a cylinder presents a marked improvement over the standard practice, as extensive tests have shown.

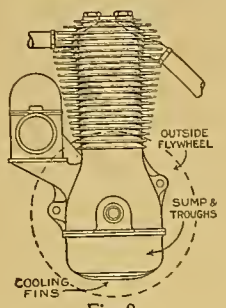
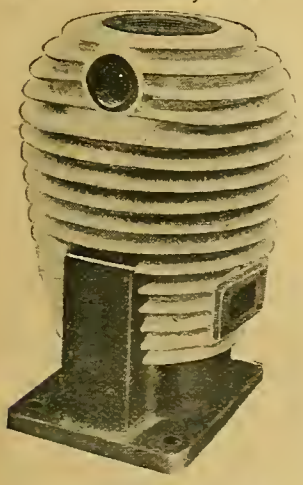


Fig. 8.

A disadvantage of the method, of course, would be that weight reduction is not so considerable as with the previous proposals, but for the purpose put forward the advantages should outweigh this disadvantage.

Incidentally it may be remarked that this construction can be applied to cylinders of rotary engines on account of the smaller specific weight of the aluminium, while the high tensile strength of the steel cylinder is in no way lessened.

The two accompanying photographs illustrate the application of the method to a cast iron cylinder, showing clearly that there is no danger of the aluminium becoming loose, as it is actually shrunk on by the casting process. The dummy cylinder has been artificially heated from the inside to a very high temperature, but during the experiment the aluminium fins showed no signs of becoming loose, while the heat radiation was very considerable.


A two-stroke cast iron lightweight cylinder with an aluminium shroud and fins to improve cooling, and at the same time reduce weight.

Detachable Head Cylinder.

In *The Motor Cycle* there appeared recently a description of the successful A.B.C. air-cooled engine employing a cylinder of a design similar to that illustrated in fig. 7. This particular design is most suitable for experiment with the various methods of improving the cooling, and no doubt the designer of this engine did not miss the opportunities afforded to him of experimenting in this direction and arriving at very interesting conclusions. Many combinations are possible, and one of the first would be an aluminium alloy head, cylinder proper of steel, and exhaust branch of cast iron. This is quite feasible, and involves only a small outlay. We might, however, object to this method, as it is not the combustion chamber which wants cooling—quite the contrary, but it is for the benefit of the valves and their seatings that the improvements must be made, thus rendering it possible to increase the compression ratio without detriment.

The next step may be still more advantageous; this consists of using an aluminium alloy for the exhaust branch. In either case it is supposed that the cast iron valve seat be secured in the aluminium as shown in figs. 1, 2, and 3. The fact of having this exhaust branch provided with substantial fins will certainly tend to preserve the exhaust valve.

These modifications have the advantage of not affecting the cylinder itself. The method of securing the head and branch to its components will render the construction very simple, and no distortion will be likely to occur.

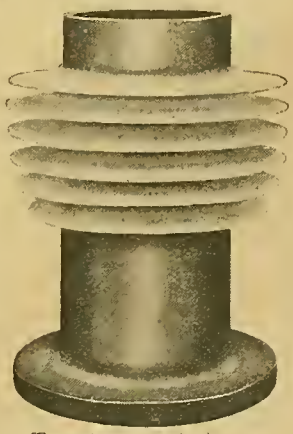
Fins Pressed on the Cylinder.

In fig. 6 is illustrated a further method of assisting the cooling of the cylinder barrel of similar design. The ordinary steel fins are replaced by loose rings slipped over the barrel; they may either be of copper or aluminium. Copper, of course, has a better heat conductivity, but it is rather heavy and more expensive. Evidently a different method of securing the head to the cylinder has to be adopted so as to allow the fin rings to be mounted easily.

It would be most interesting to hear the opinion of the designer of the A.B.C. engine on this subject, as undoubtedly he will have many valuable remarks to make, having studied these points in his design.

Aluminium Engine

Having passed in review the various methods in the employment of aluminium for cylinder construction, it may be remarked that the possibility exists of using the cylinder of aluminium alloy pure and simple without a liner, this making the construction very simple. We must, however, state in advance that this construction can only be applied to engines on which the replacement of cylinders can be taken into account irrespective of cost, after a relatively short period of service. A hard alloy will be required, and special piston rings have to be employed to reduce wear to the minimum.


This dummy cylinder was heated to an intense heat, when the cast iron assumed a blue hue, but the aluminium fins showed no sign of becoming loose.

With the possibilities of the use of aluminium cylinders, particularly those with a liner, the question of departing from orthodox practice is at once apparent. Why not make a combination of car and motor cycle practice, and produce an all-aluminium engine such as is illustrated in fig. 8? The cylinder and top half of the crank case to be in one piece of aluminium, with, say, a steel liner inserted in the cylinder. The bottom half

Aluminium and Air-cooling.—

should be easily detachable and provided with troughs for lubricating the split big end and presenting a sump to carry sufficient oil for a few hundred miles.

The crank, of course, would be in one piece, supported in split bearings between the two halves of the crank case, and carrying an outside flywheel. The piston, complete with connecting rod and shaft, could be withdrawn from below. This construction makes a very attractive and neat design, obviously possessing many advantages: simple construction, access to big end bearing, simple mechanical lubrication, and lightness.

There is, however, a disadvantage which lies in the difficulty of decarbonising the top of the cylinder, but it is hoped that with improved lubrication and efficient cylinder cooling this operation will not need to be performed so frequently as is now required.

An Appreciation of the 3½ h.p. P. & M.

Interconnected Foot and Handle-bar Controlled Clutch suggested for all Sidecars.

HAVING ridden a machine of this make many thousand miles, both as a solo and sidecar mount, and being acquainted with P. and M.'s from 1910, I claim to know their idiosyncrasies sufficiently well to warrant my expressions of satisfaction.

My present machine is a 1914 model which left the factory fairly late in that fateful year. It has never yet failed to carry me to my destination with absolute regularity, save once when the cause was tyre trouble and I had been sufficiently negligent to be unprepared.

Relative Gear Ratios.

The P. and M. is all that I desire in slow running, silence, comfort, economy, and reliability. My machine is fitted with sidecar gear ratios, giving a top ratio of 5.4 to 1. This is decidedly low for an engine such as the P. and M. when ridden solo, and in consequence there is considerable engine vibration when ridden fast, but with a sidecar attached vibration is not noticeable. A solo gear of about 4.8 to 1 is very suitable.

A large part of my riding has been done with a Watsonian featherweight wicker sidecar attached, and the way the machine behaves with this and a heavy passenger is astounding. I never choose my roads to avoid encountering hills—a custom to be recommended to those who own sidecar outfits of low power. I have ridden in the north of Derbyshire, and have yet to fail to reach the top of a hill; with the same sidecar attached I have traversed the by-lanes of Surrey and Berkshire with a passenger of medium weight, cushions, rugs, and a dog! On these lanes, it should be noted, the surface is frequently heavy enough to compensate for any lack of steepness. The engine has never overheated, even on such work as this in July, and on only two occasions have I suffered from an incandescent sparking plug. It is a great pleasure to be able to use the low gear freely without any fear of overheating or burnt valves.

Needless to say, when riding solo with the higher ratios, hill-climbing is a pleasure, and the gradient which could not be climbed would indeed be stiff.

An All-chain Advocacy.

I do not intend to buy another motor cycle employing belt or chain-cum-belt drive, as I find the chain drive excellent, and have yet to experience a broken chain on the road. I am equally satisfied with the working and durability of the two-speed gear, the take-up of which is extremely smooth.

Time and again I have been told, and doubtless so have many other motor cyclists, that these machines are unusually slow. I consider this to be an error, and I have on many occasions with my sidecar gear ratios put 3½, 4, and 4¼ h.p. singles to rout on picked roads. My machine is a comfortable touring model, fitted with T.T. bars. I have ridden all out solo occasionally, but have never yet had the engine on full throttle when on low gear either solo or sidecar.

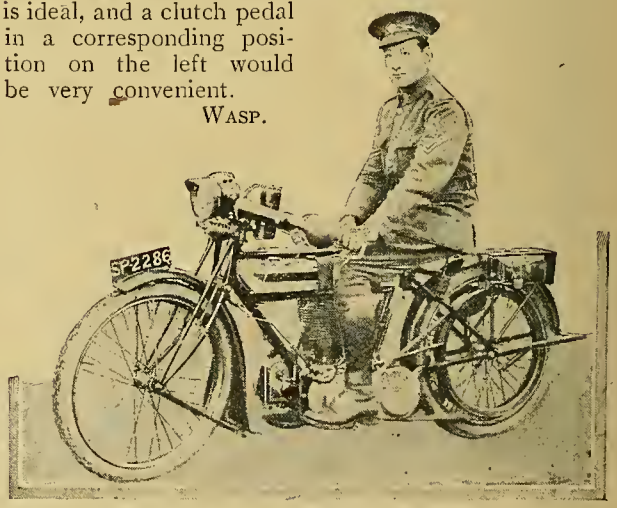
The equipment of my machine includes a leather case on the top of the tank, lined with felt, for the carriage of two spare tubes; a Lucas head lamp and aluminium tail lamp. These are both supplied by a large generator on the handle-bar, the gas being conveyed through fixed metal tubes with rubber connections. I find this system perfectly satisfactory. A Lucas horn and Brooks leather box on the carrier are also parts of my equipment.

Alterations Desired.

As is the case with most motor cyclists and their machines, there are alterations which I would like to see embodied in future models of my mount. The chief of these is an interconnected foot and handle-bar controlled clutch with three-speed gear box.

The right heel operated band brake of the P. and M. is ideal, and a clutch pedal in a corresponding position on the left would be very convenient.

WASP.

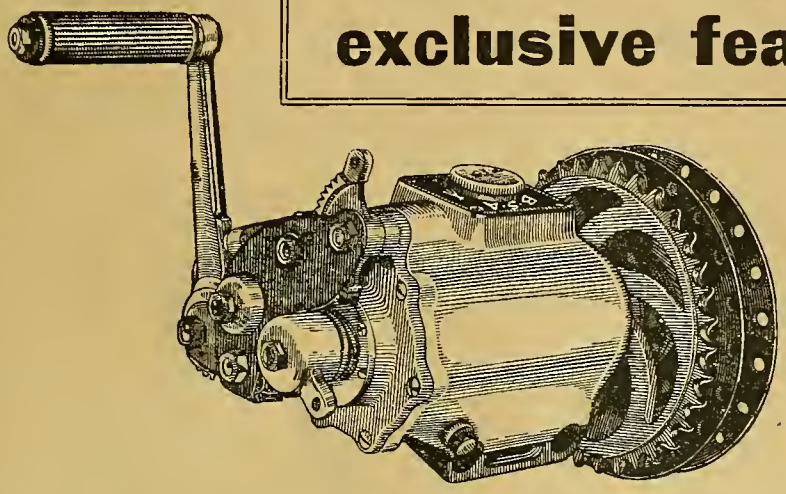


A SCOTTISH COMPETITION RIDER.

Cpl. Raymond J. Braid, a well-known Scottish motor cyclist, is at present stationed at Grove Park. A consistent performer in competition, he took part in the Tourist Trophy Race of 1914 on a 3½ h.p. Norton. He is also the ex-heavyweight speed champion of Scotland, and still holds the record for the St. Andrews course on an 8 h.p. Martin-Jap. From the commencement of the war until recently he has been a despatch rider at the front, but is now an artificer in the M.T., A.S.C.

B.S.A

Some B.S.A. exclusive features.



No. 2.

B.S.A. COUNTERSHAFT THREE-SPEED GEAR.

BY making the ascent of almost any hill easy and sure for solo and sidecar, the B.S.A. Countershaft Three-Speed Gear greatly increases the enjoyment of motor cycling. For negotiating traffic it is invaluable. The clutch is remarkably efficient and enables the machine to start away smoothly. The B.S.A. gear is simple, strong, and accessible; it is one of the B.S.A. features responsible for the popularity which B.S.A. Motor Bicycles have achieved.

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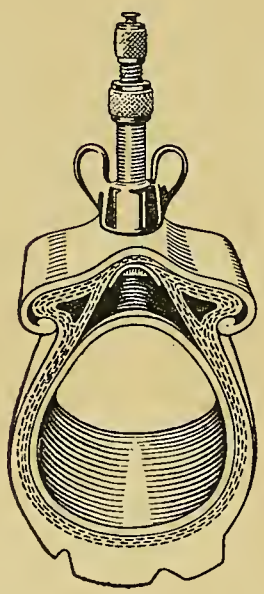

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2. It can't be creased where valve is fitted.
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MOTOR CYCLISTS IN FRANCE.

Some Criticism of the American Interview with Capt. Keene.

IN our issues of May 31st and June 7th we reprinted an interview with Capt. Louis Keene, M.M.G.S., written by Mr. J. H. Donehue in *Motor Cycle Illustrated*, U.S.A. This article was inserted in our pages as being the first publicly expressed opinion of the value of the machine gun sidecars by a British staff officer, and therefore certain to be of considerable interest to our readers, from whose ranks the M.M.G.S. was so largely recruited. We ourselves were amazed at certain remarks credited to Capt. Keene, and are not surprised that the statements recorded in the interview have come in for a considerable amount of criticism at the hands of our readers—officers, N.C.O.'s, and men—and we have received many letters of protest, chiefly of a satirical nature, a selection of which are published on this page. Further, a reasoned criticism of many points has come to hand from a major of the A.S.C., who is of opinion that the figures given are much exaggerated, and that probably one-fifth of the number would be nearer the mark. He admits it may be true that more motor cyclists have been killed by the motor lorries of their own armies than by enemy bullets, but he does not think that this number can possibly exceed 500. The speed limit of these lorries is 8 m.p.h., *and most rigidly enforced*. In the few cases in which a continuous lorry train service has had to be put into operation, as at Verdun by the French, the speed is about 5 m.p.h.

On Mudguard Clearances.

Sir,—In reading the report of an interview granted by Capt. Keene to Mr. Donehue I noticed some curious views expressed on the subject of mudguarding on British military machines.

I can state, without the slightest fear of being contradicted by anyone who knows, that British machines as used in France for despatch riding are not suitably mudguarded. The clearance between wheel and guard is so small that with the right consistency of mud on a *pavé* road the wheel will clog so badly that a 4 h.p. engine with 12 to 1 gear, or thereabouts, cannot revolve it.

It is quite hopeless to try to put these machines over some of the by-roads when in bad condition—the D.R. has to walk. J.H.

B.E.F.

60 m.p.h. on a Lorry Train!

Sir,—I have just derived very much pleasure and, incidentally, most valuable information from an article based upon an interview given to Mr. J. H. Donehue by Capt. Louis Keene. Although I have spent over two and a half years in France in the various branches of the Mechanical Transport, it is only after reading the article that I suddenly realise how my sins of the past are suddenly thrown in my face.

I feel as if I must confess only a few of the sins I have committed.

In the early part of 1915 I was driving a Holt Caterpillar, and I must admit to the fact that while these huge engines were travelling on the roads motor cyclists were not under any circumstances allowed to pursue their duties. Why, once I actually encountered three motor cyclists on one of the main roads out here, and I raged to think that these pests should sin against their traditional rules by going over the same roads as used by Caterpillars. From then and onwards to this very day my sole ambition has been ruthlessly to do away with all motor cyclists. I ran over them day after day, and even caused some of them to be flung for over twenty yards from their machines.

My bag of killed cyclists was huge in less than a year, so much so that complaints reached my Commanding Officer from the various Casualty Clearing Stations, and there was no alternative but to transfer me to a Supply Column, where I am at present installed as one of the drivers of a motor lorry.

The column I am with *always* dashes along the roads at top speed, sometimes doing as much as sixty, and woe betide the motor cycle squads we meet. We break them up, smash them right and left, and, as the interviewer remarks, it is considered as "all in a day's work."

I feel remorseful now, hence my confession.

Of course, I have heard that the general routine orders for the past two years have stated that "no lorry shall travel at a speed of more than *eight miles per hour*," but what do we care—we go on killing motor cyclists.

In conclusion, I should like to add that, having had a little experience in Yankee journalism, never have I known of an interviewer to take the liberties Mr. Donehue has taken in this article, the substance of which purports to be the experiences of an officer of His Majesty's army. (PTE.) J. M. TRAVERS,

B.E.F., France. M.T., A.S.C.

The Daring, Dashing, Lorry Drivers.

Sir,—Upon reading your article taken from the *Motor Cycle Illustrated*, of U.S.A., I rub my eyes and persuade myself that I am a hero. The vivid description of the daring, dashing lorries leaves me gasping! To brave death by venturing into the zone "ten or fifteen miles from the trenches" with a brilliant acetylene head light must make me worthy of at least the V.C. As the whole of my work lies within this area I must for ever be "simply flirting with sudden death." Flirting always has its attractions!

Now for a few facts—not sensational Yankee jonrnalism. I write as an M.T. man of over two years' experience of active service with lorry and motor cycle. Firstly, lighting limits differ in each separate district, varying according to the nature of the ground. It is seldom lorries extinguish their side lights more than five miles from the line, and I have been within two miles with ordinary paraffin lamps.

Secondly, I have not been "hurled fifteen or twenty feet ahead on the road" and then run over by a heavy lorry *many* times. Thirdly, if the writer had any knowledge of M.T. columns he would know that almost daily men are punished (often fined heavily) for exceeding a speed limit of eight miles per hour, even when it may have been difficult to perform the allotted task without a slight speeding up.

Finally, my letter is prompted by a sense of fairness to M.T. drivers. As a motor cyclist on a Supply Column I am unbiassed. Let us get on with our job whatever its *real* dangers, but let us be free from the menace of journalists whose articles are calculated to scare and unnecessarily cause anxiety to our friends and relatives at home.

A. M. FREEMAN

B.E.F. (Cpl. A.S.C., M.T.)

An M.T. Officer's Comments.

Sir,—The article by Mr. J. H. Donehue concerning an interview with Capt. L. Keene, M.M.G.S., is one that must have been read with amazement by all motor cyclists with knowledge of conditions near the front line.

Perhaps Capt. Keene is indulging in a little gentle leg-pulling, or else Mr. Donehue has misinterpreted him somewhat.

To begin with, the article in question states that the most important motor cycle service has been the M.M.G.S. What has that absolutely indispensable branch of the service, R.E. signals, to say to this?

Surely nowadays, when every army in the field is equipped with machine guns almost as portable as the ordinary rifle, the mobility of the motor machine guns is largely discounted, especially in the sort of fighting that occurs on the Western Front.

Again, it states that every foot of space immediately behind the lines is so crowded with vehicles of all sorts that a motor cyclist venturing to insert himself in the throng would be courting sudden death from the rampant lorries that Capt. Keene seems to loathe so intensely. On the contrary, road traffic within a mile of the front line is practically negligible, and heavy traffic does not come within double the distance mentioned by Capt. Keene in the average case, depending, of course, on the visibility of the roads.

To say that lorries have orders to go through at top speed, regardless of all other road users, is nonsense. On the contrary, speed limits are exceedingly strict, and the traffic control behind the lines is a most complete and elaborate affair.

When a "stunt" is on and there is much traffic, the important roads bristle with A.P.M.'s and their minions; woe betide any unfortunate lorry driver who attempts to "double bank" or exceed the limit!

The idea of running into a squad of motor cyclists and deliberately killing and maiming them—all in the day's work, so to speak—is humorous to a degree.

Fortunately, the army is not run on such slap-dash methods or the war would certainly have been over long ago!

O.C. JUGGERNAUTS,

B.E.F. A.S.C., M.T.

CURRENT CHAT

SPECIAL FEATURES

ALUMINIUM AND AIR-COOLING.
THE JAMES MILITARY MODEL. MILITARY MOTOR CYCLING NOTES

TIME TO LIGHT LAMPS

SUMMER TIME.

June 21st	...	...	9.48 p.m.
,, 23rd	...	...	9.49 ,,
,, 25th	...	...	9.49 ,,
,, 27th	...	...	9.49 ,,

Two Lucky Escapes.

We congratulate Mr. A. V. Ebblewhite, official timekeeper to the A.C.U. and R.A.C., on his second lucky escape from the attentions of enemy aircraft.

A Post-war Design.

A 7-9 h.p. V twin with outside flywheel to bear the Blackburne name was announced in a letter appearing in our correspondence pages last week.

A Wise Precaution.

A very large number of machines are standing idle, owing to the absence of their owners on military service, and under these circumstances it is well to consider the advisability of insurance against fire or theft, as the likelihood of both these evils appears to have become enhanced of late.

Proof of Pro-ally Sentiments.

150,000 dollars were contributed by the Harley-Davidson Motor Co. to the Liberty Loan floated in America. The amount named will be taken up by the company and its employees, the latter contributing their quota under a partial payment scheme. It may be mentioned that the Harley-Davidson Motor Co. was among the first to subscribe to the original Anglo-French loan floated in the States, which it did to the extent of £20,000.

A New British Magneto.

A new company has been formed in England for the manufacture of magnetos and other electrical machines, under the name of the British Lighting and Ignition Co., Ltd. We are informed that Messrs. Vickers, Ltd., are responsible for its incorporation, and hold the whole of the share capital. The name chosen for the magneto is the "B.L.I.C.," and the works of the new company are already in full blast, hundreds of the magnetos being turned out weekly.

The offices and showrooms of the company are at 204, Tottenham Court Road, London, W.1., an address which awakens recollections of a certain other magneto, but one of departed fame, which shall be nameless.

The fact that Messrs. Vickers, Ltd., are behind the production of this new instrument is a distinctly encouraging sign, for, as is well known, this firm is among the most powerful and progressive engineering institutions in the world.

Overseas Letters Sunk.

The British mail steamer which was sunk in the Mediterranean last week was, we have reason to think, carrying mails from these offices to Overseas readers.

Useful Work by A.C.U.

The A.C.U. has succeeded in obtaining supplies of petrol for several members who, though using their machines on work of national importance, have been unable to convince the authorities of their right to a supply.

The Tax Refund.

Have you applied for a refund of half your local taxation licence? If not, remember that June 30th is the last day.

A Wide Range of Choice for Overseas Riders.

The Russian military model James is described in this issue. There is now hardly a leading maker, excepting those busy producing machines for the British Army, who is not turning out a type of machine specially adapted to Overseas requirements.

The tank which was made at the suggestion of Maj.-General the Right Hon. Lord Cheylesmore, K.C.V.C., chairman of the Lord Roberts memorial workshops for disabled soldiers. It will be used as a delivery van throughout the City, West End, and Metropolitan boroughs in connection with Silent Tribute Day, to be held in London on Friday, July 6th, in aid of memorial workshops

Heard at Westerham Hill.

Parties of motor cyclists indulging in picnic teas at the week-end at Westerham and Crockenhills heard distinctly the heavy gun firing in Flanders.

The National Relief Funds.

At the week-end the principal war funds stood as follow :

The National Relief Fund (distributed £3,618,090)	£6,198,159	0	0
British Red Cross Fund	6,778,940	18	11
Tobacco Fund	131,284	12	1

Three or Four Cylinders?

A writer in last week's issue is enthusiastic over the possibilities of the three-cylinder engine for motor cycles, and though we may not, necessarily, entirely share his views, the points he sets forward are undoubtedly worthy of consideration.

More New Models.

Last week *The Motor Cycle* introduced to motor cyclists the new military model Matchless-Jap. This week we are able to give the first illustrated description of a new 5-6 h.p. twin James, hundreds of which are being prepared for the Russian Army.

A Magneto Hooter.

A firm in this country produces a lighting set supplied with the necessary current by the magneto. An electric hooter supplied from the same source is not the height of impossibility, and would be much appreciated. Such a hooter would be out of operation with the machine stationary, and thus would not serve to amuse the office boy and his chums during dinner hour.

Missing Matchless—an Arrest.

The motor cycle has proved useful in regard to another missing machine—an 8 h.p. Matchless combination. Following information laid with the police, an arrest has been made. It was effected by Detective-Sergeant Frippe, of the Lee Division, who is a motor cyclist, and who has used his machine extensively in the round-up.

Motor Cyclist Volunteers Wanted in Southampton.

Motorists of Southampton, who for the past two years have formed a motor volunteer squadron, have now received official recognition, and in future the body will be known as No. 1 Squadron, Hampshire Motor Volunteer Corps. The Commanding Officer is Mr. W. P. Brazier, and the headquarters the Royal Garrison Artillery Drill Hall, St. Mary's Road, Southampton. Applications for enrolment should be addressed to the O.C. at the address given above, and it is stated that lorries, vans, cars, and motor cycles are required.

Hampshire has been very much to the fore in the matter of motor volunteers, and the Southern Division of the Hampshire Automobile Club have carried out admirable work since the outbreak of war. The military authorities in and around Southampton are full of gratitude to the club, whose vehicles and money have been always unstintedly at the service of the R.A.M.C. for ambulance work, both by night and day in the very district in which recruits to the Hampshire Motor Volunteer Corps are now being demanded.

Streamlining.

An article in this week's issue of our contemporary, *The Light Car*, deals with the matter of streamline bodies. This article should be of special interest to motor cyclists interested in the design of the speedy type of sidecar.

Some Hustle!

The American Government are asking immediate quotations for 10,000 motor cycles, 5,000 solo mounts, and 5,000 with sidecars. No particular make or type is specified. Will the four-cylinder figure? If so we shall watch its behaviour with interest.

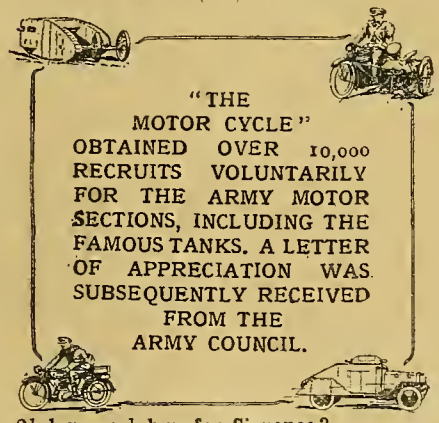
Dora says you must.

JACK : "If a policeman stops me and asks where I got my petrol, am I bound to tell him?"

JILL : "Yes, Dora says you must give him all reasonable information, but you are not bound to carry the petrol licence with you."

JACK : "Who is Dora?"

JILL : "Didn't you know that in the Law Courts 'Dora' is the abbreviation for "Defence Of (the) Realm Act?"


"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

2¼ h.p. or ½ h.p. for Sixpence?

We are informed that the Triumph motor cycle which is to be drawn for in the Newcastle-under-Lyme Bazaar was supplied to this division of the British Red Cross Society at very special terms by the Triumph Cycle Co. The second prize, as we have elsewhere informed our readers, consists of a Shetland pony.

Reward for Stolen Machine Received.

Mrs. M. Robinson, Northampton, writes us that she has received the £10 reward from Mr. T. J. Ross for giving information to the police which led to the recovery of his Harley-Davidson. "It was in *The Motor Cycle* that I read of this outfit having been stolen," Mrs. Robinson concludes.

Purely a Novice.

A novice of our acquaintance had immaculately cleaned (internally) and polished his two-stroke engine, fitted new platinum points, overhauled all minor matters, made all joints with seccotine, and so on, but, restoring the machine to the road he was absolutely horrified at the results of his labour. An expert testing it suggested numerous adjustments which had no effect. In the end a soldier—the only man in these days who has time to spare—took the engine down and found the piston to be fitted wrong side foremost —a common error.

Future of Aluminium Cylinders.

A valuable article on the alternative uses of aluminium for the cylinders of air-cooled engines appears in this issue. It will well repay study.

No More Bosch.

B.L.I.C., the name of the latest British magneto, will, we suggest, be pronounced "Blik." Already we have hundreds of initials in motor parlance, and few people are anxious for more. Still, anything is better than Bosch!

More "Tanks" Wanted.

Whilst conferring with representatives of the trades unions on the Dilution Bill, Dr. Addison, Minister of Munitions, said that when the Army was given a particularly fine piece of material it quickly asked for more.

So it was in regard to the "Tanks," but the way in which they ate up the "spares" was simply appalling.

6d. Tickets for £50 Motor Cycle.

A number of applications for tickets in the Newcastle (Staffs.) Red Cross Draw reached us last week in response to our paragraph. These remittances were forwarded to the chairman, and further applications should be sent direct to Councillor Sidney Carryer, Newcastle, Staffs. Following our appeal hundreds of applications for tickets were received direct by the Draw Committee.

The Petrol Position.

A Lincolnshire reader who applied to the Petrol Control Committee for a licence to enable him to run a second-hand motor bicycle he had just purchased has been notified as follows : "The Petrol Control Committee have recently been advised by the Government that a further drastic reduction in the consumption of petrol is necessary in the national interest, and under the circumstances they regret they are unable to entertain your application."

This decision should be considered in conjunction with the record figures given in this issue for the month's imports of petrol, in order to realise the tremendous needs of the Allied Armies.

A New Motor Spirit.

A representative of *The Autocar* recently paid a visit of inspection to the plant erected by Mr. Mat. H. Freeman for the purpose of distilling motor fuel by a new process, which—judging from the plant and equipment—has already progressed rather beyond the experimental stage. It is stated that by the Freeman process a very much lighter yield of fuel can be obtained from crude oil than by any process at present practised, and the inventor has made the chemistry of oils his life study.

In an official test this fuel gave from 10% to 20% more power output per gallon than was obtainable from the best spirits used hitherto, and though, at present, the plant is arranged for the distillation of mineral oils, the same process can be applied to the by-products of coal distillation. The invention really consists of a more efficient method of treating low grade oils, and so it may be regarded as another step in the direction of home-produced fuels.

FLIGHT-LIEUT. GEOFFREY BOYTON, R.F.C.

ALTHOUGH he is not the only Irish motor cyclist who has graduated from the ranks of the despatch riders to the Royal Flying Corps, Geoffrey Boyton, of the Ulster Centre of the Motor Cycle Union of Ireland, is not the least

Lt. G. Boyton.

distinguished of the once select but now rapidly increasing circle of men who are now practising in the air the art they learned in the hard school of competition riding. Boyton was one of the first men in Ireland to offer his services to the Government when the war broke out in the summer of 1914. He sailed for France before the end of September, and in the interval he has spent twenty-two months in that country. After a year's service as a despatch rider he was granted his commission as an observer. He was mentioned in despatches in the following June, and in the next month qualified for his "wings." Boyton has been engaged in most of the "warmest" parts of the line, since he was appointed a flight-lieutenant, and he has done his part in maintaining the moral ascendancy that our airmen have secured over those of the enemy. A rather long sick leave has kept him out of Active Service for some months past, but a period at home in the highlands of Donegal has pulled him round, and he is once more able to do his share. It is hardly necessary to remind those who followed competitive sport that, as well as being one of the best known riders in the competitions of the Ulster Centre, Boyton was the first amateur to finish in the last Tourist Trophy Race.

WHEN THE WAR IS OVER!

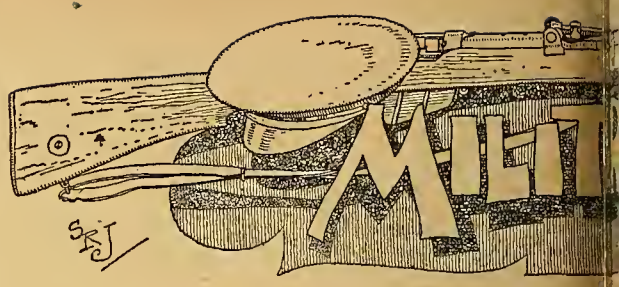
A SHORT time ago Cpl. H. Russell, who has been attached to a regiment of Hussars since mobilisation, described his experiences in Salonica. He has again written us, and discusses the opportunities clever riders may have in the motor cycling world after the war.

With such training as many D.R.'s have had on the various fronts it will be surprising if we do not find some "dark horses" of exceptional merit in the T.T. races of the future.

Cpl. Russell was connected with Sturmey-Archer Gears, Ltd., previous to the war, and, it so happens, was allotted a Triumph with such a gear.

Cpl.-Art. H. Russell.

Some idea of the difficulties despatch riders have to contend with in Macedonia is conveyed by this photograph, sent by Cpl.-Art. Harry Russell, of a Midland regiment of Hussars. There is really little wonder that we hear, now and again, grumbles respecting various weaknesses of motor cycles. The remarkable thing is not the manifestations of their weak points, but the way they stand up to the terrible gruelling they receive in all the zones of war.



A V.C. MOTOR CYCLIST.

THE grave in which the late Lt. E. F Baxter, V.C., is laid was recently traced by an officer of a Liverpoo Regiment. It is in the churchyard of a village near to Arras, and the grave i alongside two others of fallen officers. The Germans had erected a cross over the grave, with the inscription :

Lieutenant E. T. Baxter,
Liverpool Regiment,

and the date on which he died, which is now proved to be the date upon which he was officially reported missing. Lt. Felix Baxter was a well-known North-country motor cyclist, and was officially reported missing after a bombing raid. The Victoria Cross was a posthumous honour.

Motor riders of have a d of their cal of t cycle. of our recognis question company

HONOURS FOR "TANK" HEROES.

THE Military Cross has been awarded to :

Temp. Capt. Charles Stephen Cowan, M.M.G. Corps.

He caused his armoured car to be driven straight through the enemy trenches, and inflicted heavy loss on the enemy with his machine gun.

Temp. Sec.-Lt. Charles Martel Knight, M.G. Corps.

After he and several of his crew had been wounded, he returned to the starting point and took a fresh crew on board. He remained in action until unable to carry on owing to casualties, and brought his "Tank" back and all his crew.

Temp. Sec.-Lt. Charles Milward Le Clair, East Surrey Regiment, attached M.G. Corps.

Although his "Tank" was subjected to very heavy shell fire, and most of his crew wounded, he continued to fight his "Tank," and assisted to clear the village until his "Tank" was disabled.

Lt. Edward Glanville Smith, London Regt. and M.G. Corps.

His "Tank" was set on fire by hostile shell fire and under heavy fire of all kinds. He got his crew out to shell holes, and went back and extinguished the fire, collected his crew, and returned to the rallying point.

Lt. Tom Westbrook, M.G. Corps.

His "Tank" was put out of action and several of the crew wounded. He withdrew his men to shell holes under heavy fire, and himself covered their retreat with a machine gun. All the crew got back to the rallying point.

The Distinguished Conduct Medal has been awarded to Sergt. J. Noel, M.G. Corps.

He commanded his "Tank" with the greatest gallantry and skill. He put many enemy machine guns out of action and took a large number of prisoners.

...RY NOTES

...WAR WORN MOTOR CYCLES.

...WE are able to state officially that the rumour that numbers of the machines in the South-East London ...T. Repair Depot, of which we pub...hed exclusive photographs last week, would be sold by auction in separate lots is absolutely incorrect. None of this material whatever is sold to the public. As was stated in our article, 95% of the machines are repaired, what is too bad to be utilised is broken up and employed for other purposes, while the very small remainder is melted down.

MOTOR CYCLES IN WARFARE.

EITHER Staff-Capt. Louis Keene's remarks on the use of motor cycles in warfare have been somewhat distorted in America or his opinions are extraordinary. The article we reprinted from an American contemporary has brought a number of letters protesting against certain statements.

...VITH ARMOURED CARS IN MESOPOTAMIA.

...'HE thousands of motor cyclists and car drivers who applied for positions through *The Motor* ...cle Recruiting Section are ...ployed on all forms of ...bile vehicles and in all parts the world. Most are on ...tor cycles, many are driving ...s (a good percentage of ...m armoured), some lorries, ...l last but not least, Tanks, ...ich have already created ...w annals in history. An ...ormative letter from a ...ner in one of the Light ...moured Motor Batteries in ...sopotamia, which has Rolls-...yce armoured cars with ...med motor cyclists on ...uglases is appended.

Twin Wheels.

"I hope you will find this ...otograph interesting. The ... is the Rolls-Royce Conti...atal model, with Dunlop ...re wheels, twins on the ...r. These twin wheels have ...e great fault: there are ...o separate rims 'spoked' ...gether, and in the wet ...ather the mud—and, believe ..., it is 'some' mud here—squeezes between the two rims and absolutely fills the wheel, and, of course, makes the running exceedingly hard, so we find 'singles' best for the mud. Another source of trouble is boiling; a couple of miles in loose sand, which means a lot of low gear work, soon causes overheating in this climate.

Where the Petrol goes!

"When proceeding in column of route we change the cars about pretty frequently, as the car that goes first naturally has the most difficult job. While it is grinding away in first or second, the next car is ticking over nicely on top. Of course, the desert is just splendid in places, and speeds of over 50 m.p.h can be obtained. The average m.p.g. is eight—not so bad considering the size of the engines. On one occasion I had a run of eighty miles and managed to do 13 m.p.g.; this happened to be on a particularly fine bit of desert. Taking the running condition into consideration the cars do wonderfully well. We have a very well equipped mobile workshop with us, so the cars and motor 'bikes' are well cared for. The Fords with us are absolutely marvellous, and the obstacles they surmount would make peace-time drivers' hair stand on end. After this is all over, steeplechasing with Fords will become quite popular in Blighty. The Ford polo team could get a few tips from our chaps, I think.

Original Motor Cycles Still Running.

"The Douglases are still 'Charlie's Aunt,' although the sand sets up carbonisation rather rapidly, and, of course, gets into everything. The mudguard clearance is not nearly big enough, also the front brake blocks are a nuisance. The stand clips are rather weak, and the front stand much too low, while for the rear stand an idea similar to the Rudge would be ideal. The engines pull wonderfully well, the climate and the petrol (which comes from Persia) seem to suit them. Of course, they get hot, but what does not when the heat is about 120°, and do not forget that this is only April—think what July is going to be like?

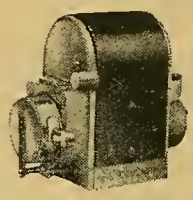
"We hear that petrol has ceased to be obtainable in England by private users; rather hard on motor cyclist 'Tommies,' isn't it? Your paper is greatly appreciated by the battery.—Jack W. Summers (L.-Cpl.)."

It is no light matter to right a ditched armoured Rolls-Royce. L.-Cpl. J. Summers, M.M.G.S., in sending the photograph, mentions that it conveys some idea of a dry water course, known as a "nullah."

A group of motor cyclist despatch riders in Egypt. Their riding apparel is not without interest, the heat being such that shorts are worn, and leather leggings on bare legs.

THE ONE-PIECE MAGNET.

SOME time ago we devoted an article to the course of manufacture of the M.L. magneto, which is to-day among the several leading models made in this country. One of the desirable points embodied in the instrument here illustrated is in the design of the magnet, which, it will be observed, is constructed in one piece, instead of being built up in sections, as in usual practice. So far as ordinary riding is concerned, the chief recommending feature of this design lies in the fact that the magneto can be made entirely waterproof, whereas, in the case of the multiple magnets, the central divisions were very pregnable points as concerned the matter of moisture. It was, indeed, no uncommon thing, on taking a magneto adrift, to find the armature rusted up, and likewise the magnets, so that contact occurred between them. This, of course, upset the efficiency of the magneto, and was the cause of endless trouble. In this new design the weakness is entirely eliminated.



The M.L. magneto. It will be observed that the magnet is made in one piece.

CHAMPIONSHIP OF SOUTH AUSTRALIA.

A Number of Local Machines Competed.

THE Motor Cycle Club of S. Australia held the above championship road race on April 7th, at Minlaton, York Peninsula, a distance by road of 156 miles from Adelaide; but by taking a sea trip of forty miles, the road distance is reduced to twenty-six miles. The inhabitants of Minlaton united with the M.C.C. and made a patriotic day of it, and with street collections and a concert a sum of £240 was raised for Red Cross work—not bad for a town of 611 inhabitants! The racing was held on a triangular course of thirty-eight miles. Solo machines up to and including 2¾ h.p. and all passenger machines competed in the 100 miles, and all solo machines over 2¾ h.p. competed in the 200 miles. The following were the results:

CLASS I.—UP TO 300 C.C. 100 MILES.

		h.	m.	s.
1.	C. Lawrence (Elliott-Villiers)	2	30	54½
2.	E. Warren (Elliott-Villiers)	2	42	19
3.	L. A. Western (Kent)	2	44	23
4.	L. A. Elliott (Elliott-Villiers)	2	54	8½
5.	B. J. Elliott (Elliott-Villiers)	2	55	57⅘
6.	F. Samson (Wyatt-Jap)	2	55	58⅘

CLASS II.—300 TO 350 C.C. 100 MILES.

1.	H. J. Gard (Douglas)	2	34	3
2.	G. A. Williams (Douglas)	2	53	30
3.	A. E. J. Klose (Douglas)	3	11	47

L. R. Mott (Kent), retired (seized engine).
F. L. Rowlands (Kent) retired (burst petrol tank).
J. H. Gilbert (J.A.P.), retired (O.H. valve gear gave way).

CLASS V.—PASSENGER UP TO 600 C.C. 100 MILES.

1.	C. Lindsay (Lewis, w.-c.)	2	51	49½
2.	L. S. Eglinton (Kent)	2	53	37⅘
3.	W. S. Hamilton (B.S.A.)	3	24	40⅘

CLASS VI.—PASSENGER OVER 600 C.C. 100 MILES.

1.	W. Wageuer (Blue Bell-Jap)	2	49	41

Roy Brown (J.A.P.), retired (petrol tank burst).

CLASS III.—OVER 350 TO 600 C.C. 200 MILES.

1.	W. A. Driver (Norton)	4	38	45

A. B. Limb (Rudge), retired (time limit).
W. H. Hubbard (Norton), retired (time limit).
R. H. Abbott (Kent-Jap), retired (valve troubles)
P. W. Carnell (Lewis), retired (petrol tank burst).

CLASS IV.—600 TO 1,100 C.C. 200 MILES.

1.	E. Ferguson (Indian)	4	5	4⅘
2.	C. W. A. Korner (Indian)	4	7	6⅗
3.	J. R. Day (Harley-Davidson)	4	8	12
4.	E. C. Wagener (Blue Spec-Jap)	4	11	44
5.	C. Gartner (Excelsior)	4	22	5⅗
6.	L. Buckeridge (Indian)	4	27	45⅘

E. E. Koster (Indian), retired (broken chain).
L. M. Gilbert (Indian), retired (punctures).
C. E. Vally (Indian), retired (valve troubles).
A. G. Dignum (Blue Spec-Jap), retired (collapsed through falls).
F. C. Tonkin (Blue Spec-Jap), retired (petrol tank burst).
N. K. Conrad (Wyatt-Jap), retired (through falls).
R. T. Latta (Abbott-Kent), retired (seized timing gear).
A. Woollard (Hazlewood), retired (rear tyre collapsed).
R. G. Pride (Matchless), retired (oil troubles).

It is significant of the road conditions that four machines should have failed from the unusual occurrence of burst petrol tanks!

BRITISH IMPORTS AND EXPORTS FOR MAY.

THE latest Board of Trade returns show that no motor cycles were imported into the country last month, the effect, of course, of the Prohibition Order. Spares continue to arrive, however, as well as tyres. In fact, under the heading of Tyres and Tubes, and Parts and Accessories thereof, stands the surprising figure of £9,791.

IMPORTS FOR MAY.

	1915	1916	1917
Number of motor cycles.	331	361	—
Value of motor cycles, with parts, tyres, accessories.	£34,200	£25,043	£9,809

BRITISH EXPORTS FOR MAY.

Considering the enormous difficulties in connection with the production for export of any commodity—quite apart from the shipping question—it is satisfactory to find the amount under the Export heading as large as it is. The figures for May this year are nearly as high as those of 1915 for the corresponding month.

	1915	1916	1917
Number of motor cycles.	858	895	819
Value of motor cycles, with parts, tyres, accessories.	£65,221	£79,866	£60,850

For the five months ended May 31st, 1917, no less than £357,796 worth of motor cycles and parts have been exported.

PETROL FIGURES FOR MAY.

There was an increase in May in petrol importation of 2,000,000 gallons, this being the highest recorded since January.

Number of gallons imported in May:

1915	1916	1917
8,190,910	10,348,789,	12,270,934

The number of gallons imported during the five complete months of this year was:

	Number of gallons.
January	13,001,740
February	12,257,984
March	9,246,546
April	10,258,951
May	12,270,934

AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average. The word "combination" indicates a sidecar outfit as supplied complete by the makers.

Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C.	1914	3½ 2-speed	—	£40
A.J.S.	1916	6 combination	£90	£96
„	1914	6 combination	£47	£57
„	1916	4 combination	£77	£58
Allon	1916	2¾ 2-speed	—	£31
„	1914	2¾ 2-speed	—	£28
Ariel	1915	3½ 3-speed	—	£45
„	1914	5-6 combination	—	£51
Bat	1914	6 3-speed	—	£48
Bradbury	1914	4 2-sp. sidecar	—	£43
Brough	1916	3½ 2-speed	£55	£56
„	1915	3½ 2-speed	—	£46
B.S.A.	1916	4½ sidecar	£67	£58
„	1915	4½ sidecar	£49	£56
Calthorpe	1916	2½ 2-speed	£30	£34
„	1915	2¾ 2-speed	£27	£23
„	1916	2½ 2-stroke	£24	£29
Clyno	1915	2½ 2-stroke	—	£27
„	1914	6 combination	£55	£65
Connaught	1915	2¾ 2-stroke	£24	£25
Douglas	1916	2½ 2-speed	—	£47
„	1915	2¾ 2-speed	£41	£42
„	1914	2¾ 2-speed	£35	£34
Enfield	1916	6 combination	£77	£81
„	1915	6 combination	—	£63
„	1916	3 2-speed	£47	£45
Excelsior	1915	8 2-speed	—	£48
H.-Davidson	1916	7 combination	£90	£80
„	1915	7 combination	£67	£65
Henderson	1916	7 combination	—	£100
Hazlewood	1914	6 3-speed	—	£39
Humber	1915	6 combination	—	£60
Indian	1916	5 combination	£65	£59
„	1916	7-9 combination	—	£77
„	1915	7-9 combination	—	£65
James	1916	4½ combination	£78	£68
„	1916	2-sp., 2-stroke	—	£31
Lea-Francis	1916	3½ 3-sp. sidecar	—	£67
Levis	1916	2¾ Popular	—	£25
„	1915	2¾ Popular	—	£22
Matchless	1915	7 combination	—	£70
New Hudson	1916	2-str., 2-speed	—	£28
„	1916	4 combination	—	£48
New Imperial	1916	2½ 2-speed	£33	£31
„	1915	2½ 2-speed	£22	£25
Norton	1916	3½ 2-speed	—	£52
„	1915	3½ T.T.	—	£45
O.K.	1916	2¾ 2-stroke	—	£21
P. & M.	1915	3½ combination	—	£65
„	1914	3½ combination	—	£52
Premier	1915	2½ 3-speed	—	£28
„	1914	3½ 3-speed	—	£45
Rover	1916	3½ 3-speed	—	£51
Royal Ruby	1916	2¾ 2-stroke	£23	£25
Rudge	1916	3½ Multi	£45	£45
„	1915	3½ Multi	£27	£39
Scott	1916	3¾ combination	—	£60
Sun	1915	2½ 2-speed	—	£23
Sunbeam	1916	8 combination	£97	£103
„	1916	3½ solo	£72	£72
„	1915	3½ combination	£80	£80
Triumph	1916	2-sp., 2-stroke	£36	£36
„	1915	4 countershaft	—	£55
Velocette	1916	2½ 2-sp., 2-stroke.	£30	—
„	1915	2½ 2-sp., 2-stroke.	—	£25
Zenith	1915	8 Gradua	—	£62

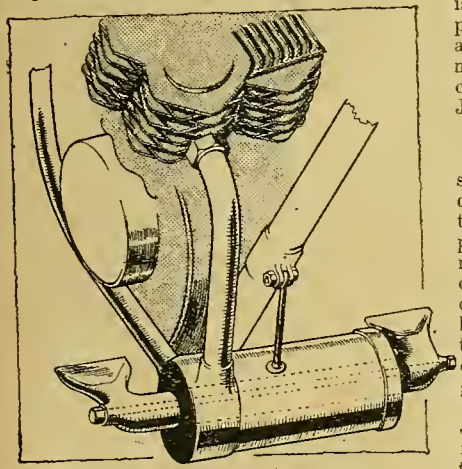
SECOND-HAND MARKET.

THE second-hand market for motor cycles still appears to be lively. Good second-hand machines are quickly snapped up, and dealers have very little to offer. This condition of things prevails in all important munition centres, the demand for lightweights between £20 and £28 in value being almost phenomenal. We hear that dealers are buying up the most modern productions.

A 5-6 h.p. TWIN JAMES.

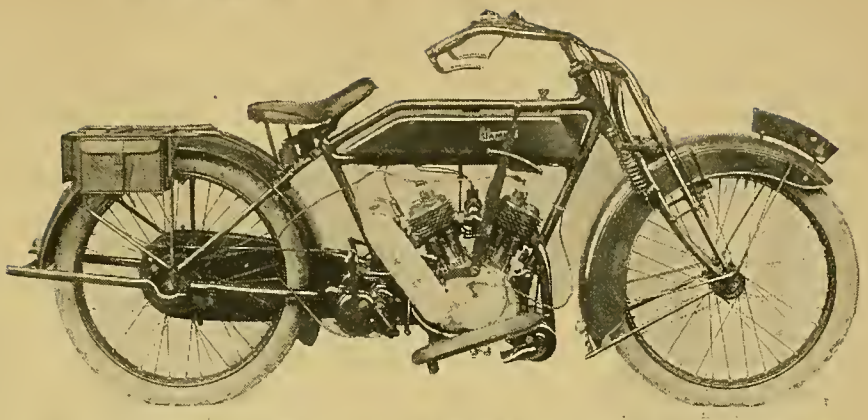
A New Double-purpose, Three-speed, Chain-driven Mount, adopted for War Service.

THE James Cycle Co., Ltd., of Greet, Birmingham, are well known for several well-tried models, notably the 4 h.p. big-single, 3½ twin, and 2¾ two-stroke. At the commencement of the war they had in hand the production of a new model, intended primarily to suit Overseas requirements in heavy sidecar work. The advent of hostilities held up progress indefinitely, but more recently it was found that this machine complied in almost every detail with the requirements of the Russian military authorities, who were placing orders for solo and sidecar machines in this country. It is now an accepted design, and is being manufactured in large numbers for use in Russia. As in all James machines, excellence in workmanship is an outstanding feature.



A feature of the model is this new pattern silencer, having outlets at either end.

The 5-6 h.p. twin power unit is of 650 c.c. (70 mm. × 86 mm.). There is nothing unusual as regards the general layout of the engine; the piston is provided with one top and one bottom ring, and a simple type of gudgeon pin fixing is used. Hoffmann roller bearings are supplied for the big-end, and the flywheels and shaft are in one piece, carefully machined and balanced. The cylinders are cast with staggered fins—following usual James practice.



James 5-6 h.p. Russian military model. The engine is of new design, and has a bore and stroke of 70 mm. × 86 mm. (650 c.c. cubical capacity)

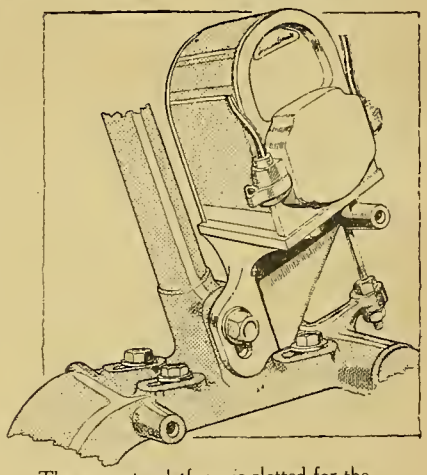
Well-designed Chain Cases.

The drive is all-chain, enclosed in very substantial covers, permitting a high degree of accessibility, as we were able to see when they were removed for the purpose of photographing the transmission. Renold ⅝in. pitch by ¼in. chains are fitted throughout. In place of the usual crank case release a short length of copper pipe is carried from the valve side across into the front chain cover, the oil spray assisting the general lubrication of the transmission. The countershaft gear box is a standard James type, giving three speeds, the ratios being 5, 8½, and 12¾ to 1, while the clutch is hand operated. The kick starter is provided with a neat rubber stop, the general arrangement being excellent. The well-known James shock absorber is incorporated in the back hub.

Great care has been taken in designing the frame; the general lines are pleasing, and strength has not been sacrificed in order to obtain the exceptional clearance of 6¼in. The design of the head follows the usual practice of this firm, being formed in triplex tubing with special sidecar lugs. The front forks have been redesigned and are now of circular taper tubing in place of oval section. This effectively prevents the tendency to whip at high speeds, which is sometimes noticeable in a fork of oval tubing.

Wheel Bearings and Accessories.

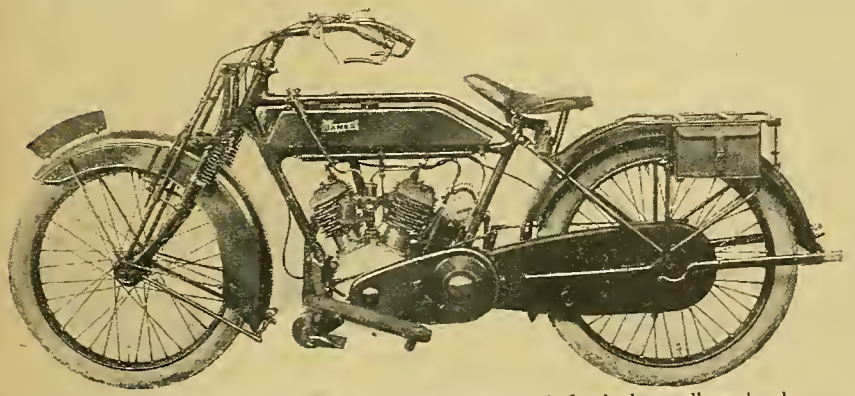
The wheels are 28in. diameter, shod with 3in. Dunlops, which ride remarkably smoothly. An Amac carburetter, Best and Lloyd drip feed and plunger pump lubrication, with an extra lead to the front cylinder, are fitted. The Thomson-Bennett magneto, with chain drive enclosed in polished aluminium casing, is carried on a special adjustable bracket fixed above the gear box on the down tube, with an extra supporting rod in front. The range of vertical movement is about 1½in., ample for all ordinary adjustments.



The magneto platform is slotted for the purpose of chain adjustment.

The tank accommodates two gallons of petrol and one quart of oil. An ample exhaust box of cast aluminium, with exits through a slotted central tube to either side, is fitted across the frame under the front of the footboards.

Large mudguards giving plenty of clearance are provided. The front spindle is of the knockout type, the whole hub being especially strong, with balls $\frac{5}{16}$in. diameter and cones of 2in. diameter. The brakes, particularly the internal expand-



A three-speed countershaft gear of the usual James type is fitted, also totally enclosed transmission and 28in. wheels.

A 5-6 h.p. Twin James.—

ing type, with large diameter drum in the back wheel, are well worthy of notice.

The general appearance of the machine is decidedly pleasing. The dark olive green finish, now so familiar on W.D. machines, is relieved by the polished aluminium timing and cam gear casings, whilst gilt labels in Russian characters adorn the tank—chiefly directions relating to the handling of the gear.

Primarily a Sidecar Machine.

A short trial run on this machine, though insufficient to reveal the power of the engine, served to demonstrate the comfort and smooth running of this model. The big tyres and wheels no doubt accounted for the absence of shock over the pot-holey surfaces encountered.

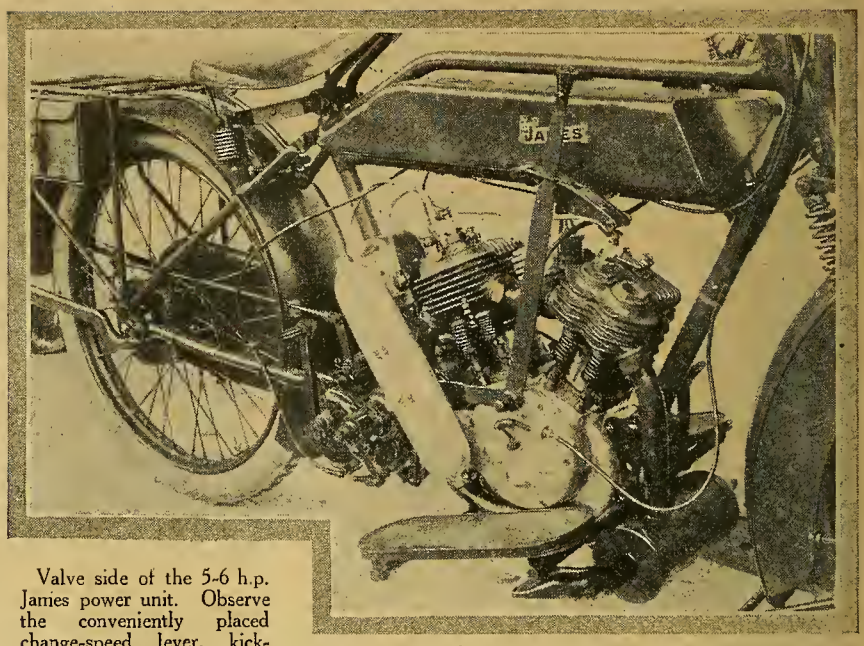
We were surprised at the easy balance of the machine, both when riding or moving it about—an unexpected point in a solo heavyweight.

As regards speed capabilities we were informed that any machine straight from the bench, without any special tuning, will touch 55 m.p.h., so that when well run in and tuned a speed of over 60 m.p.h. should be possible.

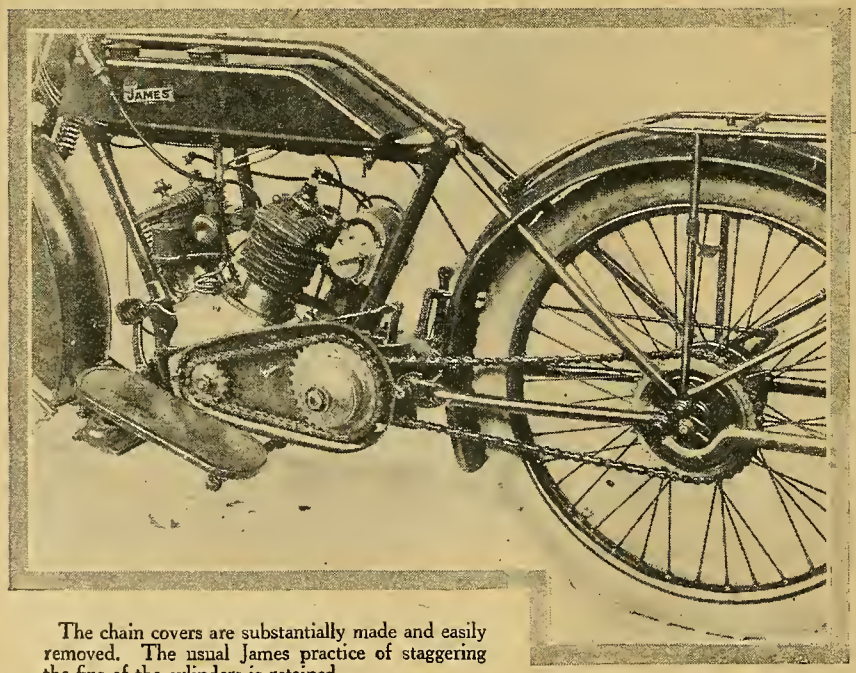
There is no doubt that it has ample power to cope with the heart-breaking "surfaces" of dust, mud, and snow to be encountered on the Russian war fronts. It has stood up well on test, both before and since its war production commenced; several experimental models have covered big mileages with heavy loads, and the members of the firm are satisfied that they have an excellent double purpose mount to offer when the times come again for general motoring.

The Russian military model James is essentially a sidecar machine, and was intended for that purpose only; but it is remarkably efficient as a solo machine—a feature not always found in heavy sidecar models. After the war, when our Ally has ceased to require wholesale delivery of these machines, their production will develop as a special model for Overseas use, whence the call for them, we have no doubt, will be considerable, and with the gradual degeneration of our English road surfaces this type of machine will find a ready sale among those who desire comfort combined with power, and who does not?

It is early yet to say anything definite as to the future proposals of the James Co., but we hope that the time is not very far off when their machines will be devoted to peaceable use.



Valve side of the 5-6 h.p. James power unit. Observe the conveniently placed change-speed lever, kick-starter, rear and hub brake.



The chain covers are substantially made and easily removed. The usual James practice of staggering the fins of the cylinders is retained.

DON'T LOSE TEN SHILLINGS!

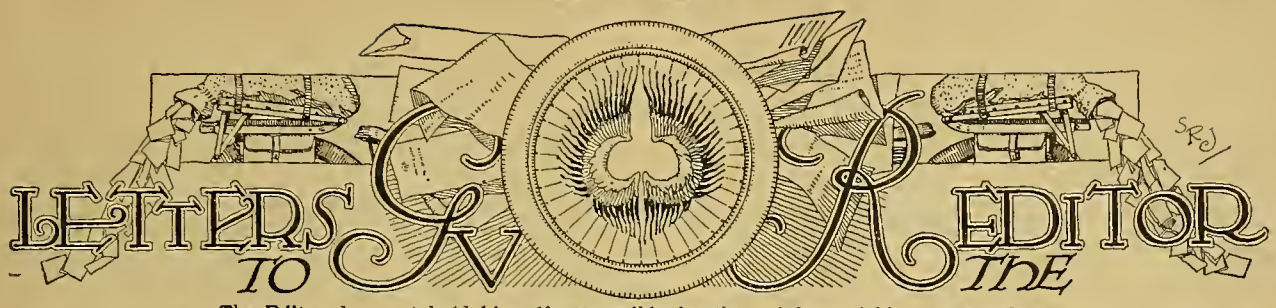
THE Finance Bill provides that if the holder of a motor car licence surrenders it before July 1st he shall be entitled to repayment of one half the duty paid. This, of course, refers to the Inland Revenue licence.

The Treasury have issued a notice that applications for this repayment may be made in England or Wales at any money order office, or to the Comptroller and Accountant General, G.P.O., London, under cover marked "Licence Refund." In Scotland, to the Officer of Customs and Excise for the Excise Station in which the applicant resides, or to the Collector of Customs and Excise at one of the following places: Aberdeen, Campbeltown, Dumfries, Dundee, Edinburgh, Elgin, Glasgow, Grangemouth, Greenock, Inverness, Perth, and Stirling. In Ireland, at any money order office, or to the Accountant, G.P.O., Dublin, marked "Licence Refund."

Motorists who have been compelled to lay up their machines owing to petrol scarcity, and who do not propose to use them again during this season, should not forget to hand in their licences for repayment of half the amount before July 1st. There is less than a fortnight left in which to obtain this rebate, which *The Motor Cycle* was largely instrumental in bringing about.

A "SAXPENNY" MOTOR CYCLE.

A SIXPENNY ticket in the Red Cross draw at Newcastle-under-Lyme may bring you a £50 motor bicycle—or a thoroughbred Shetland pony! Send for one or more tickets (a book of eleven is 5s.) to Councillor Sidney Carryer, Newcastle, Staffs.



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

BELT WEAR.

Sir,—I have been for about seven years a very interested reader of your splendid paper and have never before "rushed into print." However, the letter of "A.J.B." on belt wear in *The Motor Cycle* for June 7th has appealed to me.

I, too, had a Dunlop belt practically ruined about three weeks ago. This belt had done about 1,000 miles with hardly a sign of wear, but on returning from a ride I noticed whole stretches on which the rubber had been torn off at the sides. I have put it down to the fact that the tiny pebbles and flints which are strewn on to the liquid tar get thrown up by the front wheel and stick on the sides of the belt, and on going round the engine pulley (or counter-pulley) tear the rubber off the belt. I had ridden over about four miles of newly tarred road.

CYMRO.

Pontypridd.

TWO-STROKE PETROL CONSUMPTION.

Sir,—You have published several letters recently regarding two-strokes, and I notice "Zeno's" in the issue of May 17th, when he states that the two-stroke has a petrol consumption of 60-80 m.p.g. I am riding a James, and have repeatedly done 110 miles and still had petrol in the tank, which holds a gallon. The other day I did 112 miles, and then the engine had not stopped for want of petrol. I have fitted a hot-air intake; also heat the petrol on its way to the carburetter. I am also mixing paraffin, about 30%, and the engine runs well on it. The only drawback to the machine is when you wish to take the engine down, then, as "Ixion" a short time ago in his article on the James remarked, it is a job and no mistake. I have frequently done forty miles without a stop and run the machine pretty hard, and I find no trouble with the sparking plug, which is a Polkey at 1s. 9d.

Sunderland. JAMES.

AN HISTORICAL EVENT.

Sir,—I have read carefully through Capt. F. J. Ashley's article, and although not in any way throwing discredit on any work done by the S.A.M.C.C. in German East Africa, I should like to point out two mistakes in the "Historical Event." I object to Capt. Ashley's statement regarding the Douglases being in difficulties on the sand. Although not so powerful as the B.S.A.'s, they never failed us once where it was possible for a motor cycle to go, and I, personally, rode a Douglas the whole time I was out there—always managing to "get there." All the battery were of the opinion that the Douglas was *the* machine in German East Africa.

Another error in Capt. Ashley's article—and a rather serious one, too—is that Lieuts. Hall and MacHardy, of the S.A.M.C.C., were the first two to enter Dodoma, and he goes on to say that Capt. Goldberg would bear him out in his statement. Now, I am of the opinion, and positively certain, that Capt. Goldberg knows very well that Cpl. A. Hodgson and Bombardier Turner were the first in Dodoma, and I can declare that no other motor cyclist, or any of our column, had entered before us. We were both riding Douglases. I can recollect seeing Lieuts. Hall and MacHardy enter Dodoma when I was coming back to report to Capt. Goldberg.

I trust that you will publish this letter so that the work done by the 4th L.A.B. will be duly recognised.

Wishing the good old *Motor Cycle* the success it deserves,

4th L.A.B. A. HODGSON (Cpl.).

AN IDEAL MOUNT FOR A LADY.

Sir,—In reply to your paragraph headed "Which Type of Machine" for lady riders taking up munition work, I must say I strongly recommend a lightweight four-stroke such as a 2½ h.p. New Imperial J.A.P. or 2¾ h.p. Calthorpe with Enfield two-speed gear. The machine should certainly have a clutch and kick-starter for the convenience of the rider in traffic and in starting. Why I should choose a four-stroke is: (1.) More miles per gallon, which is a great point nowadays. (2.) Easier starting, an important point for a lady. (3.) Greater speed. (4.) Less frequent decarbonising, a job which, although not difficult, takes up the little spare time available for the tuning of the machine. I think a single-cylinder would be more suitable than a twin on account of its greater simplicity.

CADET.

Osborne.

Sir,—Tell "uninitiated lady riders" to get an all-chain-drive Velocette. I have one. I'm a duffer. But it goes uphill or down, does not mind grease. I can ride it in any dress that is not too narrow, and it does not make me dirty. It stood in a cycle shed (none too dry) all through last winter, and only wanted a little petrol injecting to make it quite ready to go anywhere again. Of course, mine is the open frame. Every mechanic that persuades me to "let him run it dahn the road to see if it is right" returns highly gratified with a smile which is only limited by the size of his mouth.

The Velocette *oils itself*—no small advantage, to my mind; and is very simple in its engine parts—so I am told, and am beginning to see.

N.B.—I have no interest in the firm; I am just a lucky buyer.

A. BROUGHTON.

A TIP FROM THE TRENCHES.

Sir,—Previous to attaining the dignity of "Cadet R.F.C." I was a despatch rider (R.E.) in France for a period of about two years. Up to the present I have refrained from relating my exciting experiences and escapes from shell fire while riding "umpteen" miles behind the firing line, in close proximity to the trenches at Rouen.

However, I drew my back pay the other day, so perhaps I may be allowed to give a few of the little dodges I learnt while motor cycling in France, for the ink *will* flow. As regards a certain single-cylinder machine I have nothing to say. It was reliable and therefore monotonous. The twin cylinder, machine, however, required careful tuning to perform the work required.

One of my duties was to keep a W.D. Douglas in tune for an officer in the Engineers. This officer was a road hog in every sense of the word, and gave his machine little or no consideration. He complained that the machine would not run full out for longer than half an hour without partially seizing. I checked the valve timing and magneto timing, fitted new piston rings, decarbonised, and tried various jet sizes, but all of no avail. Finally, I suspected the plugs, so I filed off the earth points and bent over the central electrode until it almost touched the body of the plug, with the result that the machine would run all day at a high speed without "drying up."

In the winter I fitted copper caps, about 1½in. deep and 2in. in diameter, over the plugs to keep them dry. These plugs were fitted in the screwed portion of the electrode, and kept in position by the terminal nut. In the summer I removed these caps, and found the engine had a tendency to overheat. On refitting the caps this trouble disappeared, so I came to

the conclusion that they conducted the heat from the central electrode.

I do not suppose that these remarks will be of any use to your readers, but I simply had to write, though I have not yet descended to poetry. CADET R.F.C.

Oxford.

ANOTHER REMARKABLE WAR MEETING.

Sir,—Some months ago I purchased second-hand from a cycle agency at Stamford Hill, a 2¾ h.p. Jap-Wolf machine to use locally. Recently, I was riding *via* Brick Lane to Liverpool Street Station. I reached Norton Folgate when something seemed to give, and the ground became nearer. It was a weird sensation—as if I were falling down a hole in the road. I jammed my brake on, avoiding a spill, and found that the head of my machine was fractured. I was contemplating the damage, when two "Tommies" came up. One of them said to me: "You are riding my old machine. I was a garage owner at Newcastle-on-Tyne. I had a smash on a track with that 'bike.'" He then showed me the lines of an old fracture. On joining up his partner sold the stock of machines, and the Wolf was one. Is it not a funny world—that he should be there to see an accident to an old mount of his?

Clapton. A.B.M.

A POPULAR PAPER.

Sir,—Enclosed is a photograph of what I saw while walking up the drive some time since. Having a small camera with me, I took a "snap" without the knowledge of any one of the subjects. They are, as the photograph shows, keenly

Thursday morning at Wycliffe College.

interested in *The Motor Cycle*. We have three copies of this paper weekly at school (Stonehouse, Gloucestershire) and it is much appreciated, many of the cadets being of the (motor bicycle) age.

Personally I take in *The Motor Cycle*, beside reading it at school, and find it exceedingly interesting.

EVAN J. WOOD.

THE POWER AND WEIGHT OF SIDECARS.

Sir,—I have read with interest the article on points of design, etc., of motor cycles which have appeared lately in the ever-looked for "Blue 'un." At a time like the present, when so many of us out here are thinking of the good times to come, and making mental notes of items we *must* have incorporated in our post-war mounts, the remarks by "Chinook" on the "Power and Weight of Sidecars" (May 31st) are opportune.

It is, of course, well known that some of the best performances in competitions have been put up by the single-cylinder outfit, but while this gives satisfactory service in ordinary use, something is wanted for serious touring having a little more power, or why should the twin six be so popular?

There is no doubt that many sidecars could be improved in design, and that a more judicious choice of sidecars of a weight suitable for the engines is desirable.

The published table of "Weight per Cubic Capacity" is very interesting, and at first sight sets off the 6 h.p. twin as a poor mount in comparison with lower powered machines. But are the weights given for sidecars quite fair, and, incidentally, why are the weights of passengers taken as 280 lb. in each case except that of the 499 single, where it is some 265 lb.?

As regards equipment weight, the average 3½ or 4 h.p. machine carries practically as much as the average "six," and, further, many, if not most, of the leading sidecar manufacturers recommend their standard model for either the single or twin. Taking then the same weight of sidecar, 130 lb. and passengers 265 lb., the "weight capacity" ratio comes out at 1.05 instead of 1.13 in the case of the 622 c.c. 4 h.p. twin.

Let us look at the various sidecar weights given and deduce the ratio of sidecar weights to cycle weight.

H.P.		Ratio. Weight	H.P.		Ratio. Weight
7	(1,000 c.c.)	.79	4	(550 c.c.) T.T. ...	.42
6	(770 c.c.)	.75	3½	(499 c.c.)	.50
4	(620 c.c.)	.62	2¾	(349 c.c.) T.T. ...	.50

Just why the medium-powered machine is favoured with a proportionately lighter sidecar than either the lightweight or heavyweight is not clear, and, of course, gives it a more favourable weight-capacity ratio. If an average sidecar weight and cycle weight ratio is taken of, say, .60, the following revised table is arrived at:

Machine.	Weight of Machine	Weight of Sidecar	Total Weight	Weight in lbs. per cub. cm.
7 h.p. (1,000 c.c.)	380	228	888	0.89
6 h.p. (770 c.c.)	365	219	864	1.12
4 h.p. (620 c.c.)	260	156	696	1.12
4 h.p. T.T. Single (550 c.c.)	240	144	664	1.21
3½ h.p. Tourist Single (499 c.c.)	260	156	696	1.39
2¾ h.p. T.T. Single (349 c.c.)	190	104	574	1.64

Here the 6 h.p. and 4 h.p. twins tie for second position, and leave the third place a long way behind.

But there are two very important points where the 6 h.p. scores. No matter what is the type of machine, the weight of baggage, spares, etc., carried when on tour remains the same—this also applies to wind and road resistance—and has a proportionately greater effect the less the power of the machine. Secondly, a machine which is usually working with a large reserve of power is better able to cope with any emergency conditions which may arise.

Against these considerations there are the disadvantages of having a cycle of more weight, meaning a less satisfactory solo mount and slightly higher upkeep expenses.

No doubt discussion on this interesting subject has already been recorded in the latest issue of *The Motor Cycle*—which I anxiously await—but the foregoing remarks may prove interesting. H. LOMAS (CPL. R.E.).

B.E.F.

SPARKING PLUG DESIGN.

Sir,—If "H.B." found his ideal, or near it, in the Bosch plug I can only assume that he has given it a very limited testing. I admit that it performed quite satisfactorily in some engines, though it was never above reproach in gas-tight qualities. My last experience with it was in 1913, in a small car engine where the plug gets hot. After a week or two the insulator could be shaken about by hand in the body of the plug, and could be heard tapping from the seat of the car when the engine was running slowly, and it was this noise which first drew my attention to its condition. I wrote and complained to the makers, who offered to send new ones in exchange. These were received and behaved in exactly the same way in even less time than the first. These particular plugs were of the fan shaped electrode variety, which were, I think, a little later type than the split electrode variety to which "H.B." refers. Still, the body, insulator, and workmanship were the same.

To compare plugs such as Hobson and Lodge with Bosch is, in my opinion, quite an insult to the former, though evidently not intended as such.

I can quite understand that "H.B." has "no complaint to make of the insulation on some of our best plugs." I think he might have left out "some of our best" if the Bosch plug satisfies him in this respect.

If our makers like to try the central split electrode by all means let them do so, but will they please not give us insulators or packings which shrivel up as soon as they become warm, and tap like a badly-managed typewriter?

Bawtry. W.F.W.

THE FLAT TWIN IN THEORY AND PRACTICE.

Sir,—Having been a constant reader of *The Motor Cycle* for a number of years, I have read with great interest letters criticising the flat twin. Myself, I have ridden mounts of various kinds, and, in consequence, feel bound to give credit where due. In dealing with the flat twin, I must say that I find it a most pleasing machine, and have yet to experience my first mechanical trouble. It is alike economical on petrol, tyres, and belts, and absence of engine vibration reduces the strain of long runs—both on the rider and the frame of the machine. I am at present riding a W.D. Douglas, 2¾ h.p., and I find it will take hills with any 3½ h.p. single. Of course, it is essential to change down early so as to keep the engine "revving" fast. The 2¾ h.p. Douglas is a wonderful machine and stands up to fast work admirably, and engine vibration is entirely absent even at lowest speeds. Its acceleration and even running make it wonderfully easy to handle in the thickest traffic, and starting up is instant. For light solo work and reliability give me the flat twin every time, which is quite fast enough for our work, and is a favourite mount of many despatch riders.

Wishing your paper every success, I make the usual disclaimer.

Plaistow. G. S. BARROW, R.E.

SPEED LIMITS.

Sir,—Everybody appears to be urging various reformations in the design of "after the war" motor cycles.

May I suggest a reformation of a different character? I refer to the present absurd speed limit of 20 m.p.h.

There is absolutely no reason whatever why there should be a speed limit at all in the open country; or at least it should be much greater than 20 m.p.h. Nowadays one has perfect control of a machine at practically all speeds.

By all means impose a speed limit in towns and villages, and see that it is strictly adhered to. It is only fair to the inhabitants that they should not be troubled by cars and motor cycles tearing through the streets. But on an open road it is perfectly safe to travel at 40 m.p.h., and, in some cases, more.

As to the danger of meeting cross roads, sharp bends, etc., at speed, this could be overcome by placing conspicuous notices at all dangerous points. I am quite aware that there is a certain type of individual who would abuse his newly found liberty, but he is in a distinct minority.

I sincerely hope that this suggestion will provide food for thought, and that we may yet travel at a reasonable speed with a clear conscience. PHILIP STONE.

GEAR RATIOS.

Sir,—I quite agree with the author of the article, "The Incubus of the Sidecar." Most of the so-called T.T. machines are merely the standard mount masquerading with a few alterations.

What a young man and sportsman wants is a special sporting mount with engine and gear box made for "fast touring" (or speed work). It is exactly the same with the motor car, where a man wants a sporting type of car, not a standard model fitted only with a racing-like body!

What would you think of a sporting car with the same gear ratios as the corresponding standard car?

On the motor cycle in question a higher gear ratio must be fitted. This is done by fitting a special sprocket on the engine-shaft. What happens is that in doing so your engine loses a certain amount of flexibility. Suppose you want at least 55 m.p.h. (it is not too much for the present days), you must have a ratio, for an engine (Triumph and Sturmey-Archer are my idea for this example) turning at 2,800 r.p.m., of at least 4 to 1. Now with a 5 to 1 ratio many gradients can be climbed on top, but with a 4 to 1 or more it will be quite a different thing.

So when obliged, by load on engine or traffic or anything, to use the middle gear uphill, one drops to 36 m.p.h.; and as it is nearly impossible with a mono-cylinder highly geared to get again into the top gear of 4 to 1 on hills, one is bound to continue at this pace. And this is not fast enough for the kind of mount I have in mind. The low gear will only be used for starting and in slow town work (in connection with the clutch, if one is fitted).

I do not favour the T.T. machine (for road) without a change speed gear. This is a drawback to old times! I am very interested in the A.B.C., and the C model "Road Rider" speaks of would be the thing if fitted with ratios giving (in proportion to each other at the same number of revolutions per minute) 55, 40, and 28 m.p.h. But I suppose this machine is faster than that.

I am expressing the collective opinion of leading French solo riders, and I feel I owe very much to the English motor cycle trade for the good sport I have been able to have with their splendid productions. My aim is to be, if possible, of use to them in return. H. E. PLATEAU.

Paris.

BALL BEARING CONNECTING RODS.

Sir,—Under the above title in your issue of May 31st, there is a letter from the Technical Sergeant-Major of the Royal Flying Corps stationed at Reading. I do not know the nature of the previous correspondent's inquiry "J.C.B.," through not being able to see the previous issue of *The Motor Cycle*; but, in my opinion, it is clearly necessary, in the interests of a great number of your readers, to point out some very obvious errors in the statement made by the Sergeant-Major.

The Sergeant-Major makes the solid statement that the rotary engine is not a reciprocating engine; that statement is fundamentally wrong. He also, by inference, includes radial engines in the same class as the rotary engine. The radial engine is as much a stationary type as the Beardmore, the Wolseley, and other stationary types of aero engines, with which the Sergeant-Major must be well acquainted, from the fact that in all these types the crankshaft revolves and the cylinders and crank cases are stationary. The Gnome, Clerget, Monosoupape, and Le Rhône rotary engines, and the radial type engines are all engines of the reciprocating type, quite as much so as any stationary type.

The Sergeant-Major says: "It is one thing to swing a part round a given point, and quite another to jerk it about in space, as is done in the reciprocating engine." So much is readily granted, but such a state of affairs does not occur in the rotary engine. From the above statement the Sergeant-Major asks us to believe that all the pistons, through their respective connecting rods, are being whirled round a central point. The facts are quite different. The pistons are all driving on to one point which is fixed concentrically to the centre of the engine.

The central point of a rotary engine is the centre of the crankshaft. The crank case is circular in all its essentials, and the cylinders are attached radially round this crank case. The cylinders and crank case revolve round the centre of the fixed crankshaft in a circle as geometrically true as mechanical efficiency can make it. In this sense the cylinders remain at the same distance from the centre of the crankshaft during the cycle of revolution, just as the similar parts do in any stationary engine. Those elementary, but essential, facts once absorbed by the mind, it will require but little further understanding to realise that, the rotary engine which possesses a crank, a crank pin, and connecting rods and pistons, these latter parts will reciprocate along the cylinders during the working of the engine. The fact that the crankshaft is stationary and that the cylinders revolve radially does not, in any one whit, change the mechanical forces acting through the piston to the crank pin from those which come into action in the stationary type. The radial engine is simply a rotary engine with the moving parts reversed. In the former the crankshaft revolves while the cylinders are stationary, and in the latter the reverse is the case. The details of valve gear are different, but in all essentials the engines are alike. The reason why ball bearings are used in rotary and radial engines big ends is because all the connecting rods concentrate on one crank pin through one big end common to all the rods, and that the pressure transmitted through this common big end to the crank pin from the firing of alternate cylinders results in a fairly constant pressure being exerted on the crank pin throughout the revolution of the engine. In the case of a rotary and of a radial engine it is a question of employing a ball bearing in one big end only, whereas in the stationary type it is a question of employing ball bearings in six, eight, or twelve big ends. There exists no mechanical reason against the employment of ball bearings in big ends of stationary engines, but there does exist one serious objection from the aeroplane designer's point of view, in that it would entail the employment of much larger crank cases. PICARDY PITT.

SHOCK ABSORBERS.

A Discussion as to the Best Type and the Best Place to put it.

THERE is no doubt that, as time goes on, standardisation of motor cycles and their component parts will reach a much higher degree than at present—that is, if any degree of standardisation can as yet be claimed—and one thing which will tend towards general standardisation more than anything else will be the individual manufacture of components by specialised firms. Let us take, for example, that vastly important yet little thought of unit, the transmission shock absorber. Every experienced rider knows the vitally important part it plays (or should play)—especially in the case of a single-cylinder machine—not only as regards the comfort of riding, but from the point of view of tyre wear, engine wear, and, indeed, wear and tear of the machine throughout. Yet in this country to-day each manufacturer who employs a shock absorber has his own original type. Some are good, some questionable, some distinctly inefficient and faulty.

Even the best position for this unit is as yet undecided—so far are we from anything in the way of having attained standard practice.

Need for Standardisation.

This unit might advantageously be made as a component, and for the following reasons. In the first place, if it is to function perfectly, it needs to be made thoroughly well, it needs to be most carefully designed—in fact, it needs to be a specialised job. To carry out these conditions tots up the expense of manufacture to a figure beyond the range of the manufacturer who turns out, say, only twenty machines a week, whereas, if the component were made by a specialised firm, turning out some hundreds of shock absorbers per week, and constantly testing and experimenting, a present-day weakness in many motor cycles would be removed.

Existing Methods.

Let us briefly review the existing methods of absorbing transmission "snatch," passing on to a discussion concerning the subject in general. The systems at present employed may be tabulated as follows:

1. Friction device, situated on engine-shaft.
2. Friction spring device (Sunbeam) situated on the engine-shaft.
3. Spring shock absorber located either on the engine-shaft or in the rear wheel sprocket.
4. The cushion drive, located either on the engine-shaft or in the rear wheel sprocket.

For the purpose of illustrating how opinions vary, let us further enumerate the illustrated choice of a few leading manufacturers.

1. P. and M. and others employ friction device on engine-shaft.
2. B.S.A. fit a spring device on engine-shaft.
3. Humber, Clyno, and Velocette employ spring device in rear wheel sprocket.
4. Enfield use a friction device on engine-shaft and cushion drive in rear sprocket.
5. Lea-Francis employ cushion drive on engine-shaft only.
6. Other leading manufacturers employ no shock absorber at all, because they have found that nothing but the most costly mechanism would be sufficiently foolproof for the general public. They prefer rather to depend upon an efficient clutch, reasonably accessible to the hand of the rider, than to take the risk of a shock absorber that might slip excessively.

Fig. 1.

Fig 2

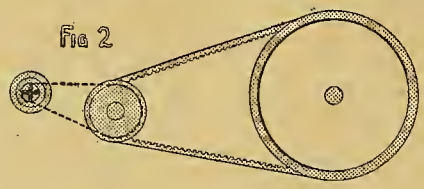


Fig 3

Fig 4

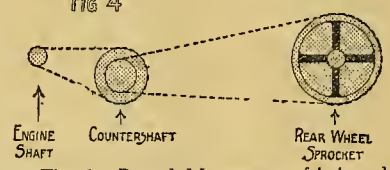


Fig. 1.—P. and M. system; friction shock absorber on engine-shaft.
Fig. 2.—B.S.A.; spring shock absorber on engine-shaft.
Fig. 3.—Enfield; friction shock absorber on engine-shaft and cushion drive in rear wheel.
Fig. 4.—Suggested system.

Excessive Slip must be Checked.

Slip excessively! Here we run up against the key to the whole situation. The shock absorber should be so designed and so placed that, when slackened off to its limit, it gives the correctly "soft" drive, any adjustment then made tending to reduce its shock-absorbing propensities—*i.e.*, to give a solid drive, and thus eliminate all possibility of excessive and inconvenient slip.

Regarding the direct belt drive as obsolete, an efficient shock absorber is undoubtedly necessary on any single-cylinder machine. On a single-cylinder two-stroke it may, perhaps, be modified to a cushion drive in the rear wheel, but even with this type of machine, if the drive be chain throughout, something more than the cushion drive is, in the writer's opinion, desirable.

Be it understood that the shock absorber functions least on the broad highway. At anything over 20 m.p.h. it is probably idle, but when necessary at all, *i.e.*, when running slowly, when climbing, or when starting up on a cold engine, it is exceedingly necessary.

Shock Absorbers.—

Summing up, then, on a single-cylinder four-stroke machine, whether chain-driven throughout or by chain and belt, an efficient shock absorber is desirable. On a sidecar twin it is undoubtedly desirable, though perhaps not indispensable. On a two-stroke lightweight it is a welcome refinement—*unless* a friction gear be employed with final belt drive, when its inclusion would, perhaps, be superfluous.

A Criticism of Present Types.

As regards the efficiency of the various types of shock absorbers now in use, the writer is all in favour of the friction shock absorber in preference to the spring type—and for this reason: that while the friction type assists enormously in the hill-climbing capabilities of the machine, the spring type, though it undoubtedly does what it is supposed to do when running slowly on light load, does not add one iota to the climbing abilities of the machine. To appreciate this point, let us consider what is the exact function of a shock absorber. Its function is to relieve the engine of the dead load (the snatch) that falls upon it on the instant of explosion, to enable the engine (or rather the connecting rod) to impart the momentum to the flywheels instead of dead on the chains, the flywheels delivering the load in an even torque over the succeeding one and a half revolutions. The spring shock absorber does not do this, because, when ascending a steep gradient, the load on the transmission is such that the shock absorbing springs are constantly fully compressed, with the result that, at the moment of the impulse, the drive is already solid, and the power stroke is nipped in the bud, as it were, by the dead resistance of the drive, instead of being stored up in the flywheels to be evenly distributed. The friction device, on the other hand, permits an unlimited degree of slip, and if properly adjusted it conveys the engine torque, not directly from the impulse of the connecting rod, but from the mean speed of the flywheels.

Another objection to the spring shock absorber is that, since it is never at rest, the springs inevitably lose their tension and become slack, and a slack spring drive is a thousand times worse than no spring drive at all.

For these reasons it would seem that the spring shock absorber will not last, and the only visible alternative is the friction shock absorber. Something which is neither one nor the other, but which partakes of the merits of both, and concerning which we may hear more "after the war," already exists, but it does not come within the category of goods samples, and therefore cannot be discussed.

So far the friction shock absorber is the best the writer has sampled, but for the following reasons the engine-shaft is the wrong place for it: (1.) Its necessarily restricted diameter, *i.e.*, it is too small for efficiency. Owing to its limited gripping surface its adjustment is a matter of a hair's breadth. (2.) It is alternatively deluged with oil or run dry (according to the mood of the rider), and its limited range of adjustment will not allow for these differences. (3.) It is often inaccessible. Its adjustment means in most cases the removal of the front chain covers, which should be sealed with seccotine and never touched. (4.) Its adjustment generally necessitates the use of a hammer and cold chisel—two implements one does not carry aboard. Taking it, then, that the friction shock absorber is the best, it must be accessible and easy to adjust, otherwise, as experience has shown, its mechanical advantages are outweighed by its practical disadvantages.

In justice to the Sunbeam people, however, it should be added that their engine-shaft shock absorber does not, when once set, require any further adjustment, and its shock-absorbing properties are good.

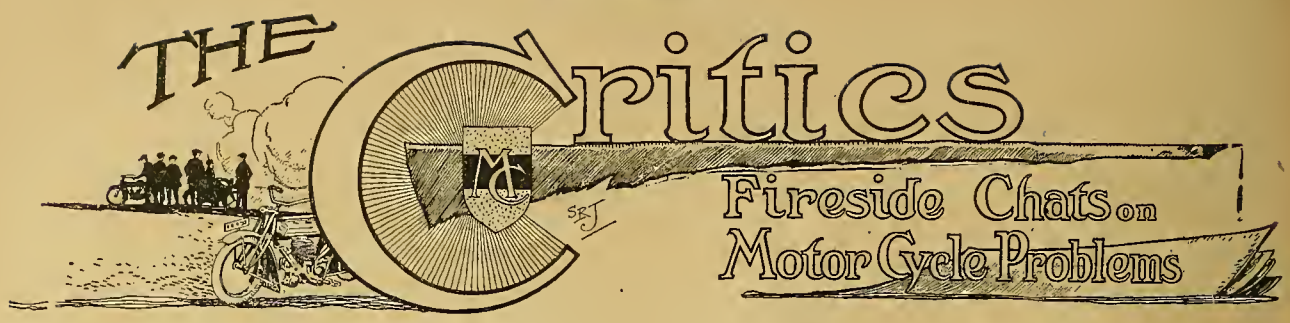
A Suggested Design.

As we learnt that ample friction surface in clutches is the sole road to efficiency, so we have yet to learn in shock absorbers. One way to overcome the above objections and to obtain a foolproof and accessible mechanism, permitting a convenient range of adjustment, is to adopt a slow speed device contained in the rear wheel sprocket. In this sprocket there is ample room for a light and efficient friction shock absorber of the plate clutch type, its adjustment being by accessible thumb screws, so arranged that, when the screws are slackened off, the adjustment is approximately correct, while any tightening of the screws increases the friction of the plates, and thus solidifies the drive.

The Cushion Drive.

The cushion drive must be regarded as distinct from the shock absorber. It is not a shock absorber in the true sense. It is the purpose of the shock absorber to sort out the lumps; it is the purpose of the cushion drive to soften down the drive, eliminating all grinding motion, and imparting a sensation of silken running, which it does admirably. There will always be a demand for cushion drives, whatever the development of shock absorbers, for while being a highly effective fitment it possesses the very desirable quality of being foolproof and unadjustable. CHINOOK.

An obelisk near Northallerton erected to commemorate the Battle of the Standard, 1138. The bicycle is one of the latest pattern B.S.A.'s.



THE DIFFERENCE BETWEEN A SKID AND A SIDE-SLIP.

WHEN that evening the Novice turned up with a square of plaster eclipsing his left cheek bone, and with his right knee presumably encased in plaster of Paris, the wide grins that greeted him could hardly be described as sympathetic.

"Who did it?" queried the D.R. "Been sacking the cook or quarrelling with the office boy?"

The Novice lowered himself into a chair with the air of many injuries. "Had a beastly skid!" he stated gloomily; "got into the tramlines in avoiding a cow." He removed his pipe and turned to the Manufacturer. "If you chaps would evolve a solo mount that wouldn't skid," he added, "you would bestow an endless blessing on us grey heads of the fraternity."

The D.R. recommended an electric bathchair as a safe antidote. "Positively the only cure for a man who contrives to fall off a modern lightweight."

The "Unskiddable" Machine.

This, to say the least, was unsympathetic, and the Novice, who was naturally in an irritable mood, bristled up instantly.

"It's all very well for you knuts to talk about skidding as being the result of bad riding," he blurted out. "In my opinion, it's merely a matter of time before the best of riders comes a cropper. You read about machines that stick to the road like postage stamps. Wish to goodness I could get hold of one!"

The Journalist sniffed. "Naturally in a solo machine the danger of skidding cannot be eliminated," he stated, "but a tremendous lot depends upon design."

"Such as a low frame, low centre of gravity, a pronounced tread on the tyres, and so on," snorted the Novice. "Well, every modern machine embodies these points, yet they all skid!"

His companions smiled leniently.

"Look here, old chap, it's jolly rough luck your having come off," the D.R. sympathised, "but if you will forgive me saying so, it may be largely your own fault. The Journalist and I were examining your machine when you left it outside the other evening, and we noticed that not only were the back wheel cones a trifle slack, but also that there was an abominable amount of play in the steering head."

The Novice stared at him. "And do you mean to say that would cause a side-slip?" he asked.

The D.R. shrugged his shoulders. "It would, at any rate, upset the entire delicacy of control."

The Novice was interested. "I should like to get to the bottom of this matter," was his very natural decision. "What are the chief causes of side-slip?"

Largely a Matter of Adjustment.

"Fifty per cent. rests with the designer," stated the Manufacturer, "the remaining fifty per cent. with the rider—not only in judgment, but in keeping his machine properly adjusted, in handling his controls (notably clutch, gear lever, and throttle) judiciously. The steering angle is an important point."

"But you can become used to almost any reasonable steering," argued the D.R. "In my opinion, the engine and the transmission are the most important. I remember one chain-driven single I had which was provided with a friction shock absorber. Ordinarily that machine was very steady on grease, but if you screwed up the shock absorber, so that the drive was nearly positive, it was practically impossible to keep right end up on a skiddy road."

"Was that when you were in the R.F.C.?" asked the Journalist suggestively.

"No, before. An adjustable shock absorber is a wonderful preventive of skidding if you will take the trouble to adjust it to the season of the year. If it were designed so that an adjustment was a clean job, occupying only a few seconds, we should hear less of side-slip."

"But," pointed out the Journalist, "you speak now of the chain-driven single. Most chain-driven twins have no adjustable shock absorber, and none of the chain-cum-belt machines have one."

"No," sneered the D.R.; "the belt-driven machines do not really want one, because the belt generally slips automatically when wet weather comes along."

General Security.

"There are other points," pursued the Manufacturer. "Smoothness of torque at the rear wheel, decided by the engine and transmission, is enormously important, but with proper distribution of weight and a low centre of gravity, the length of wheelbase, combined with decent handle-bar design, is equally important. When you get astride one make of machine you feel that you are on foreign land, and you timidly avoid stiff corners in the traffic. You get aboard another make, and instantly you feel that you are at home, and ready for the Manchester cobbles on a wet day, just because—" —and here the Manufacturer waved the stem of his pipe at them all—"just because the designer has worked out his riding position point by point, till he has hit upon a happy combination which practically eliminates skidding. It cannot be done solely on paper. Neither is it any one point which decides the steadiness of a machine on grease. If your position, your bars, and the distribution of weight generally are correct, then you can run through grease in safety, even if your transmission is harsh."

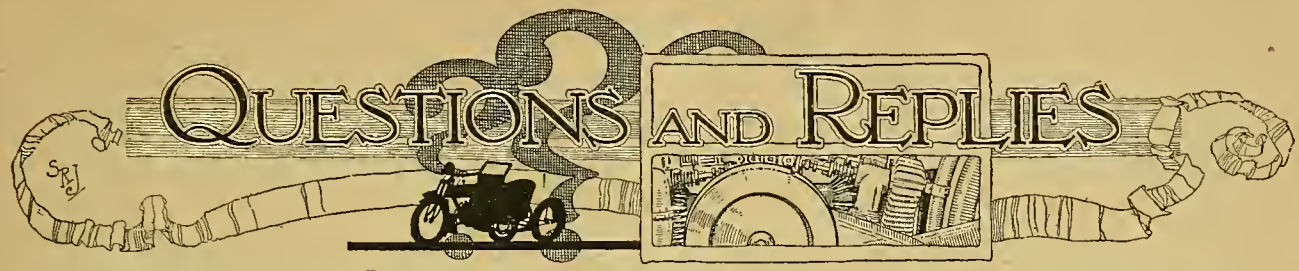
"True, you can," said the D.R., "but not because you don't slip. If your transmission is harsh, you are sure to slip more or less, but, provided your design is such that you are absolute master of the situation, the slip is merely in the form of wheel spin."

A Distinction between Side-slip and Skid.

"Quite so," agreed the Journalist, "there are two sorts of side-slip. One occurs when by bad judgment or bad riding, the wheel is flung sideways out of its natural course; the other is when by harsh transmission or by clumsy fingering of the controls, wheel spin evolves itself into side-slip. The first species is a skid pure and simple, reflecting upon the art of the rider. The most perfect design on earth cannot prevent it. The second species, the true side-slip, reflects upon the designer. It is caused by back wheel spin, which the slope of the road instantly converts into side slip. On your perfectly-balanced machine you stand a better chance of recovering from either, but if your drive be harsh, wheel-spin inevitably occurs in grease, and may at any moment turn into side-slip."

The D.R. agreed that this was very sensible. "Nervousness is the primary cause of ninety per cent. of the tumbles," he summed up. "The nervousness of a rider is decided by his general feeling of security. If the balance of his machine is doubtful, and he feels insecure and rides in dread of a skid, he will get one as safe as houses. He sets his body rigidly, forces his machine out of its natural course, and so down he goes; whereas, if his machine were designed to give a general sense of security, all would go well."

At that moment the landlady entered with an enticing assortment of glasses and other things on a tray, and the Manufacturer, to relieve the tense anticipation of the moment, remarked, "So long as men ride with the unbusiness-like, upward-sweeping, out-of-date handle-bars the Novice favours, they deserve to have falls, that's all!"



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle, 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Gear Ratios.

I have a 1914 three-speed hub gear Triumph, to which I have just fitted a sidecar, and have lowered the gear to 4¼ turns of the pulley to one of the belt rim. Is this too low for sidecar work? Also can you tell me how to loosen the lock-nut of the pulley of this machine, as three local firms have failed to do it, and state that I must remove cylinder to do this?—A.R.

The gear in question is not too low for sidecar work; in fact, we question if it is low enough. Five to one is about right in ordinary country.

The best way to loosen the pulley lock-nut is first to soak it with paraffin, then get a very long spanner, see that the belt is reasonably tight, get someone to apply the foot brake, and then hit the end of the spanner hard with a hammer.

Slow in Warming Up.

My 6 h.p. combination smokes and runs very unsteadily for the first mile or two. I can start it on the stand with the air lever closed, but if I open the air the engine stops at once, and I have to run it a while before I open the air, which even then must be done carefully, or the engine stops. The carburetter appears to be all right. Could an air leak do this? I do not think there can be any leakage in the carburetter. Could there be leakage in the engine about the valves? What is the best way for finding air leaks? I have examined the carburetter very minutely, but cannot find anything wrong with it.—W.D.

Your trouble is, in all probability, due to air leak, not in the carburetter, but at one of the joints in the induction pipes. Examine thoroughly the induction pipe telescopic joint, which is a common source of leakage. Your best way of finding air leak is to put the gear in neutral and run the engine at half throttle, at the same time dripping lubricating oil over all suspected joints. If leakage is indicated by the oil being drawn through, carefully wipe away all oil, then drop seccotine over the joint, with the engine still turning over. This will draw the seccotine well into the crevices, and the joint should finally be bound over with insulation tape. Air leakage can also occur round the valve stems. Test the valves in their guides for slack, and if this is excessive you should have the guides renewed. The present day quality of petrol certainly has an effect on the running of an engine till warmed up. Your trouble might also be due to too small a jet.

A Permit to Drive?

(1.) Is there any chance, if running on paraffin, of being stopped and asked for your petrol licence? (2.) Is starting on acetylene dangerous? (3.) Have there been any experiments lately on using graphite with ball bearings?—C.G.C.P.

(1.) There is, of course, a risk that you may be stopped and asked for your petrol licence, but you are not compelled to take it with you, nor can you be summoned for not possessing one. (2.) Here again there is a slight risk. You might start on acetylene several hundred times with perfect safety, then perhaps on one occasion you get an extra violent explosion which might break the connecting rod. Special care should be taken not to flood the engine with gas. (3.) Yes; there have been many experiments which have demonstrated that the use of graphite with ball or roller bearings is undesirable and entirely unnecessary.

Running on Paraffin.

I have a 2¼ h.p. motor cycle, which I bought second-hand a few months ago. I have been running so far on petrol and substitutes, and now have access to some White Rose paraffin. (1.) Will it harm the engine in any way to run on this? (2.) Would it be more suitable to start on petrol and run on paraffin, or to mix them? (3.) Will the carburetter require altering in any way? I have a B. and B. carburetter with adjustable jet and air, also a spare tank.—C.J.C.B.

(1.) If you are careful it will not harm the engine to run on paraffin. (2.) Of course, the best mixture would be, say, two-thirds petrol and one-third paraffin, but if you have not enough petrol for this, then start on petrol and run on a mixture, using the most petrol you can spare. (3.) The only alteration to the carburetter would be the fitting of a hot-air intake. When using paraffin, empty out your crank case rather more frequently, and use plenty of oil.

DELAYS IN POSTAL DELIVERIES.

In view of depleted staffs, the curtailment of railway services, and the consequent delay in delivery of mails, readers will greatly assist by forwarding communications (including advertisements) as much as possible in advance of the dates of the issues for which they are intended.

White Oil.

Over here, in Rouen, several cars and taxis are running on white oil. I have a small quantity of this fuel, and have tried it in a large blowlamp; and though I think it requires more heat than petrol, the results appear to be about the same. It does not seem to vaporise so readily as the lighter fuel. I have not tried it in my motor bicycle yet, and fear it may damage the tank in course of time. Does it carbonise more than petrol, and is a large jet required?—J.O.

White oil is a distillate of petroleum which has not quite the same qualities as petrol. It may be used satisfactorily in a motor cycle, provided a warming device is fitted to the carburetter. Unless the vaporisation is perfect it is likely to carbonise rather more than petrol. Probably the same jet would do, but a smaller one might be fitted with advantage. It will not damage your tank.

Engine will not stand Magneto Advance.

(1.) I have just purchased a 1912 F.E. Triumph (second-hand), but the machine will not stand the ignition advanced—even on the flat. Immediately I pull back the lever on the tank, and so retard the ignition, the machine shoots forward. The timing of the magneto is as follows: When the ignition is fully retarded the piston is at dead centre, and the points are just breaking. Is this the correct setting? (2.) Also my Triumph will not take much air, even at a fair speed—say, from 30 to 36 m.p.h.—and I move the throttle and air lever practically together. There do not appear to be any air leaks; the petrol pipe and jet are quite clear. I am using a single point Lodge plug, with a fair sized gap and a medium sized jet. (3.) I wish to make my touring bars into semi-T.T. shape. Is it possible to heat them sufficiently over a kitchen fire, so as to be able to bend them? (4.) Is it possible to bend the bars without heating them, and if so, is it likely to weaken them at any particular part?—G.R.

(1.) Try the same setting, but with the lever half-way retarded. (2.) You might try a larger jet. (3.) We do not think you can bend the handle-bars satisfactorily in this manner. (4.) It is not advisable to bend the bars without heating them, and you might kink and crack them. We should recommend you to get an expert to carry out this alteration, as you would probably damage the bars.

Storing a Sidecar.

(1.) As I have just detached my sidecar for the summer, should I leave the tyre soft or hard? (2.) Can you tell me how the fork spring of a Rudge should be oiled? It is totally enclosed and seems dry.—H.H.

(1.) Keep the tyre slackly inflated and the wheel jacked up from the ground. It is as well occasionally to moisten the cover with tepid water. (2.) Lubricate at the grease cups, of course. The telescopic sheath enclosing the spring is packed with graphite, which should last a considerable time. If it seems dry it would certainly be a good plan to repack it. See "Rudge Wrinkles."

Graphite as a Lubricant.

(1.) Do you advise mixing, say, 10% graphite with grease when packing the front and back hubs? (2.) I have a 1916 4¼ h.p. B.S.A., and wish to attach a sidecar. What is the maximum the sidecar and chassis should weigh? I have one offered to me which weighs, complete, 126 lb. Is this too heavy, as the body is 70 lb. and the chassis 56 lb.? (3.) Is there any possible way of silencing the tappets?—B.P.

(1.) There is no need to use graphite. All that is required is a packing of grease which will exclude grit. Vaseline and Prices' hub lubricant are both excellent for wheel bearings. (2.) We should say that the sidecar is quite heavy enough for a single-cylinder engine. The weight should not exceed 120 lb. (3.) The fitting of fibre insertions would tend to silence the tappets.

Two-stroke Rattle.

I have a 1915 two-stroke with Binks three-jet carburetter. The machine has been going splendidly, but recently a metallic ring or rattle has started, emanating from the engine. This has got so bad that it begins at about 20 m.p.h. and continues at all higher speeds. Decarbonising has done nothing to lessen it, although the piston head, etc., was thick with carbon. The magneto chain is not very slack, though in some positions it is much tighter than in others. I am positive that the rattling is not due to any loose accessory on the machine. There is no up or down play in the big-end or gudgeon pin, though there is some side play. The piston has three piston-ring slots—one at each end and one in the middle. There are rings in only the top two slots. Could the absence of a piston ring in the lowest slot cause this metallic rattle? If so, why did it not occur previously? The magneto timing is about correct.—E.B.D.

You are evidently troubled with what is known as two-stroke rattle. No definite solution has as yet been arrived at as to what is the cause of this. You might try the effect of slightly bevelling the top of the piston, so that the edge cannot catch the rims of the ports, should piston be a trifle slack. It is apparent that the reason why you cannot now cure the rattle by decarbonising is that slackness has occurred somewhere in the engine, probably between the piston and the cylinder. Try the effect of changing round your piston rings. We do not think that the absence of one ring would cause the rattle, but we would certainly advise you to try the effect of using all three rings. Have you made sure that no back pressure is occurring through carbon deposit in the exhaust pipe or silencer? Make sure also that nothing is touching the outside flywheel—the brake rod, for instance, which the natural position of your foot might press against the wheel when you are mounted.

Local Taxation Licence.

I shall be extremely obliged if you can give me a little information on the following point regarding £1 Revenue licence: In July, 1914, I purchased a second-hand 7 h.p. combination, and paid £1 tax for the remaining five months of the year. I also paid £1 for 1915; but in 1916, owing to the rumour of the tax being increased to £4 14s. 6d., and also the threatened scarcity of petrol, I did not take out a licence, and the machine has been out of use since 1915. In January of this year I purchased a lightweight, and have taken out one £1 licence. Will you please tell me if I can run them both with one licence, provided they are not both *out of the shed together?*—E.K.

If you have used both machines during the present year, then you are clearly liable for a second local taxation licence. If, however, you have used only one, then you may store the other and continue on your present local taxation licence. You cannot run two motor cycles with the same licence.

A Featherweight Sidecar Outfit.

My 2¾ h.p. two-speed, clutch, 1914 twin runs all right up to about thirty miles an hour. Above that it pulls up after running about five or six miles. A stop of a few minutes and all is well, so long as you do not push the pace over about twenty to twenty-five miles an hour. With Henderson light sidecar on level road, the engine heats up or pulls up in about two miles. Can you give me the cause? Is the 3 to 1 ratio between the driving pulley and back wheel too low for a sidecar on level Cheshire roads? I am content with twenty to thirty miles an hour.—F.E.H.

Your trouble may be due to any of three causes: (1.) To pre-ignition caused by an unsuitable sparking plug. You might try the effect of air-cooled racing plugs. (2.) To pre-ignition caused by a flake of carbon or roughness in the cylinder casting of the combustion head. (3.) One or both of the pistons may be rather a tight fit, with the result that partial seizure occurs at high speeds. If after trying new plugs and cleaning the combustion heads and pistons, the trouble still occurs, we would recommend you to try a different grade of oil, and use it rather more freely than hitherto. With featherweight sidecar attached, your machine should certainly not be geared higher than 6 to 1 on top. You will find that very much more lubricating oil is necessary with the sidecar.

An Unfortunate Breakage.

I would greatly appreciate your advice on the following: (1.) I have broken the shaft of my 3¾ h.p. single-cylinder, and have taken the engine down, but I do not know whether the shaft separates from the flywheel, as I have been told that the flywheel and shaft are in one piece. I certainly cannot move it. (2.) If it is all in one piece, would it be possible to have it repaired as it is, only the threaded part being broken off through a fall, or shall I need to get a new flywheel and shaft? (3.) There is a little play on the connecting rod; it touches the flywheel (side play), and just what one can feel on the big-end bearing (up and down). Would it need to be rebushed?—W.O.

(1.) The shaft will be exceedingly difficult to remove from one flywheel; in fact, it may be regarded as a permanent fixture. By examining the inside of the flywheel you will be able to ascertain whether the shaft is integral or jointed. (2.) Considerable strain is imposed on these parts, and therefore we are afraid that no certain repair could be effected. The only satisfactory course would be to obtain the flywheel and shaft complete from the makers, who, incidentally, would give you all the information you require if you state year of manufacture or number of your engine. (3.) It certainly sounds as though the wear on the big-end is excessive, and though it would probably hold out for some time, it would be as well to renew the bush while the engine is down.

RECOMMENDED ROUTES.

COVENTRY TO ROCHDALE.—C.K.

Coventry, Twycross, Ashby-de-la-Zouch, Derby, Belper, Matlock, Bakewell, Buxton, Chapel-en-le-Frith, Glossop, Stalybridge, Oldham, Rochdale.

SIDMOUTH TO LLANDRINDOD WELLS.—L.E.B.

Sidmouth, Honiton, Chard, Ilminster, Ilchester, Lydford, Shepton Mallet, Radstock, Bath, Nailsworth, Stroud, Gloucester, Ross, Monmouth, Raglan, Abergavenny, Crickhowell, Talgarth, Llyswen, Erwood, Builth, Llandrindod Wells. Approximately 185 miles.

FOLKESTONE TO STRATFORD-ON-AVON.—Folkestone, Ashford, Charing, Maidstone, Wrotham Heath, Riverhead, Westerham, Redhill, Reigate, Dorking, Leatherhead, Cobham, Weybridge, Chertsey, Egham, Windsor, Slough, Maidenhead, Henley, Nettlebed, Benson, Dorchester, Oxford, Woodstock, Enstone, Shipston-on-Stour, Stratford-on-Avon. Approximately 180 miles.

EPSOM TO BARROW-IN-FURNESS.—J.R.

Epsom, Surbiton, Hampton, Staines, Windsor, Slough, Beaconsfield, High Wycombe, Stokenchurch, Wheatley, Islip, Bletchingdon, Chipping Norton, Moreton-in-the-Marsh, Broadway, Evesham, Worcester, Kidderminster, Bridgnorth, Wellington, Whitchurch, Tarporley, Warrington, Wigan, Preston, Lancaster, Carnforth, Levens Bridge, Lindale, Newby Bridge, Ulverston, Dalton, Barrow-in-Furness.

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London

Victoria Road, Willesden Junction, N.W.10.

BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.

TRADE MARK

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The Petrol Famine

LUBRICATION troubles will follow when Owners of Motor Cycles are reduced to the use of

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C. C. Wakefield & Co., Experts in Lubrication, the firm that conducted the 7,500 Miles Fuel Mixtures-Lubrication Tests, will be glad to give the benefit of their experience to interested enquirers.

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"HINTS & TIPS" (which deals mainly with four-strokes).
"ALL ABOUT TWO-STROKES" (which no two-stroke rider can afford to be without).

WE SHALL BE HAPPY TO SEND YOU EITHER OR BOTH POST FREE ON APPLICATION.

BROWN & BARLOW, Ltd., Westwood Road, WITTON, BIRMINGHAM.

THE DUNHILL M.C. JACKET & OVERALLS

AS SUPPLIED TO H.M. GOVERNMENT.

Planned on the saddle, so to speak, the garments combining smartness with perfect ease and freedom.

Made in Lightweight Materials, for Summer riding, and properly ventilated.

The quality is unequalled anywhere for the price.

GUARANTEED ABSOLUTELY WATERPROOF.

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359-361, Euston Rd., London, N.W.

2, Conduit St., W.

Manchester: 90-92, Cross Street.

Glasgow: 72, St. Vincent Street.

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PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed ——— & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305

NEW 6h.p. A.J.S. and second-hand sidecar; what offers?—Noar, Hillfield, Alderley Edge. [X1381

1916 A.J.S., 2¾h.p., 3 speeds, Lucas lamps, etc., Land clutch, excellent condition; rights to 15 gallons petrol; £40, lowest.—West, 245, Barry Rd., Dulwich, S.E.22. [3939

A.J.S., 1915, 2¾h.p., 3-speed, clutch, T.T. bars, P. and H. head lamp, generator, rear lamp, tools, sound tyres, machine perfect throughout; £43/10.—Advertiser, 156, Gt. Portland St., W.1. [4203

1916 4h.p. A.J.S., 3-speed, chain drive, h.b.c. clutch, semi T.T. bars, 2 Lucas lamps, guinea Lucas horn, with coachbuilt sidecar complete; £77.—Robinson's Garage, Green St., Cambridge. [4088

1916 A.J.S. 4h.p. Combination, hood, storm apron, luggage grid, straps, Lucas long horn, exhaust whistle, 3 lamps, suit of oilskins, spare cover, tools, spares, etc., 75 m.p.g.; £80.—Rockall, 17, Shirley Rd., Chiswick, W.4. [4101

Alldays.

1915 Allon, 2¾h.p., 2-speed, Senspray, E.I.C.; £23.—Railway Garage, Staines. [3947

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [X0796

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if the fastener fails!

Has it ever struck you how much depends on the selection of one that is really dependable?

Fit FORWARD Fasteners —they never fail.

The one shown below is the FORWARD, the strongest on the market. Price 1/6.

Other models in our range are:—

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Detachable 1/-
Adjustable... ... ... 1/3
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Detachable ... ... 9d.
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Ask for new Catalogue.

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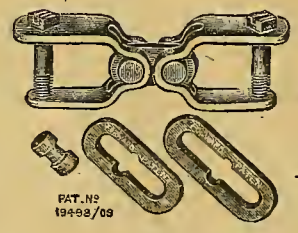

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Polished and Plated.

No. 74.
Post Free,
3/3
Net.

For injecting Grease and Heavy Oil into Gear Cases, Hubs, etc. A most useful article for all speed merchants.
Thousands are being supplied to the Government.—
Vevo Works, PARK LANE, BIRMINGHAM.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30-miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

Alldays.

ALLDAYS Allon, all models in stock at Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [4038

1916 Alldays Allon, 2¾h.p., in very good condition; £20.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0597

ALLDAYS Allon, 1916, 2¾h.p., mag., 2 speeds; 32 gns.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [4155

1916 Allon, 2½h.p., 2-stroke, unpunctured, unscratched, not done 800 miles; £24.—416, Richmond Rd., 1st Floor, Twickenham. [4177

ALLONS, new 1917 lightweights, delivery from stock; exchanges with Levis, Douglas, sidecars, in good condition.—Smith, 268, Lavender Hill, S.W. [3977

ALLDAYS, 1914, 3½h.p., 3 speeds, countershaft, chain driven, coachbuilt sidecar, in real good order; £30.—Percy and Co., 337, Euston Rd., London. [4066

1917 Alldays Allons, 2-speed models; immediate delivery; also 1915 2-speed model, £22/10; deferred payments if desired.—Jones, Garage, Broadway, Muswell Hill, N.10. [4192

ALLDAYS Matchless, 1913, 3½h.p., 2-speed, Binks 3-jet, spring footboards, and Terry's links, excellent tyres, best lamps, accessories, spares, real good running order; £25, or offers.—Schoolmaster, Harlington, Middlesex. [X1490

Ariel.

3½h.p. 3-speed Ariel Combination; £28.—239, Liverpool Rd., Islington. [4082

ARIEL, 3½h.p., 1917, 3-speed countershaft models, in stock.—Crow Bros., Guildford. [2562

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

1917 Ariel in stock for immediate delivery; deferred payments if desired.—Jones, Garage, Broadway, Muswell Hill, N.10. [4181

Auto-Wheels.

WALL Auto-Wheel, little used, complete, splendid condition; £8/10.—98, Scarborough St., West Hartlepool. [X1388

AUTO-WHEEL, in very good condition; £7/10, or exchange for lady's cycles to value.—Box L3,814, c/o *The Motor Cycle*. [3676

AUTO-WHEEL, late model, little used, perfect, £8/10; tricycle attachment if required, 21/- extra.—Smith, 268, Lavender Hill, S.W. [3975

GENUINE Wall Auto-Wheel, little used, complete, splendid condition and running order; £8/10.—Murray, 37a, Charles St., Hatton Garden, Holborn. [X1504

Bat.

BAT, 8h.p., 2-speed, chain and belt drive, Bramble coach sidecar; £39/10.—68, Horton St., Halifax. [3906

BAT, 8h.p. twin J.A.P., N.S.U. 2 speeds, with sidecar, in real nice condition; £25.—Percy and Co., 337, Euston Rd., London. [4056

Blumfield.

BLUMFIELD (late) 5-6h.p. twin, new heavy Dunlops; bargain, £22/10.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [4156

Bradbury.

BRADBURY, 4h.p., 2-speed, free engine, coach sidecar, perfect order; £36.—Bright and Hoyles, 73, Church St., Camberwell Green, S.E. [3633

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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Telegrams: "Motorcycle, Coventry."
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AUSTRALIA—Gordon & Gotch, Ltd., Melbourne (Victoria), Sydney (N.S.W.), Brisbane (Queensland), Adelaide (S.A.), Perth (W.A.), and Launceston (Tasmania).
NEW ZEALAND—Gordon & Gotch, Ltd., Wellington, Auckland, Christchurch, and Dunedin INDIA—A. H. Wheeler & Co., Bombay, Allahabad, and Calcutta.
SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

Oil Cooling.

IN the early days of motor cycle engines the idea prevailed that the whole power unit should be made as compact as possible, the flywheels being a very close fit within their casing. This practice has given way to more commonsense methods, yet it would appear that some advantage might be gained by producing the amount of clearance one stage further.

We do not regard the enclosed flywheel as permanent practice. Certain types of flat twins with outside flywheel have taught the experimentalist that the crank case capable of carrying perhaps five times the quantity of oil that is actually needed for distribution offers certain advantages. To begin with, a very large oil sump, with its ample surplus, counterbalances any neglect on the part of the rider, and eliminates the likelihood of the engine drying up when subjected to sudden bursts of speed. Many riders are apt to forget their hand-operated drip feed for quite long periods when passing through attractive surroundings, and at length, recalling its existence, they feed two or three charges to the engine in order to make up the deficiency. This "hit or miss" kind of oiling is calculated entirely to upset the order of things when the oil-retaining reservoir is small, but if, on the other hand, the oil sump be of sufficient capacity to hold out during several miles of average speed work, an ample margin is provided for irregularities in the administration of the lubricant.

To repeat: In early engines very little flywheel clearance was left, with the result that excessive fluid friction was occasioned as the result of over-oiling, and, moreover, the imprisoned oil in the crank case exercised a decided braking effect on the flywheels when starting up from cold in winter, so more clearance was allowed between the flywheels and the crank case. But by allowing still greater clearance, in fact, by employing a sump, the life of the engine is likely to be considerably increased. Even though the hand pump be dispensed with, and mechanical lubrication employed in its stead, the system here advocated would retain its advantages, for with this system an "oil level" could be relied upon, whereas with the round, closely-fitting case the matter of level is mainly a myth. The oil is flung all round the inside of the crank case by the flywheels, and the only time when there is really an "oil level" in the case is when the engine, standing idle, drains itself.

There is another advantage to be gained in the provision of a special sump, in that the quantity of oil, thus freely circulated, would have the effect of cooling the engine internally, while the oil itself would not be so likely to lose its lubricating qualities owing to excessive heat. The sump, for that matter, might consist of a series of fins or oil-containing grooves, aero engine practice, thus assuring a low temperature of the lubricant throughout circulation.

Motor cycle engines are unnecessarily costly in lubrication, and it is certainly time some provision were made for maintaining the oil at a low temperature, thus improving lubrication and eliminating wastage. This becomes more than ever necessary now that highly efficient high-speed engines are likely to become a popular type.

War Shattered Machines and the Public.

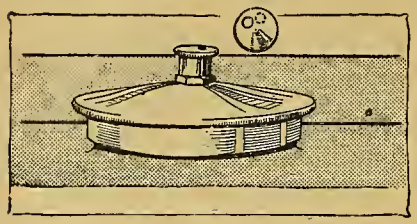
AN excellent suggestion reaches us from a correspondent this week. It is that the hundreds of war-worn motor cycles, heaps of which were illustrated exclusively in *The Motor Cycle* of June 14th, should be open to the public gaze on payment of a small admission fee, to be placed to the credit of the Red Cross Fund. Judging from expressions of opinion which have reached us, following upon the publication of our article and photographs, and bearing in mind the extraordinary interest aroused among travellers on the railway line adjoining the field, the venture would, we should say, be bound to prove an entire success.

An index to the advertisements in this issue will be found on the page facing the back cover.

IDEAS: Useful and Ingenious.

TO PREVENT WASTE OF PETROL.

FEW motor cyclists realise the great wastage of petrol that takes place directly from the tank. Unsuspected leaks often occur, from which the precious fuel creeps slowly but continuously, and is evaporated before it is perceived. Another source of waste is at the filler cap. The ordinary air vent in the cap sometimes allows the petrol to escape freely when washed about the



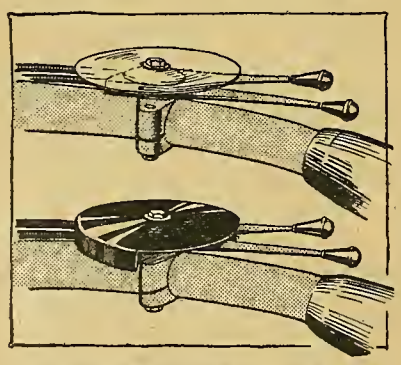
To prevent waste of petrol at the filler cap, insert in it a small hub lubricator.

tank. This overflow can be prevented by inserting a small hub lubricator in place of the ordinary air hole.

Small leaks in the tank are quickly found if a little paraffin be put with the petrol. The former fuel, which does not evaporate freely at atmospheric temperature, creeps along the tank and is perceived by the fact that it rapidly collects dust.—J.P., Hull.

PROTECTING CONTROL LEVERS.

AFTER a long wet ride it is frequently noticeable that the control levers work more stiffly. The cause of this is rust, and motor cyclists need hardly be told that it is bad for the fine cable wire, and is frequently the cause of the strands breaking. A remedy is to cut a circular piece of celluloid, or tin, and insert as shown in the illustration.

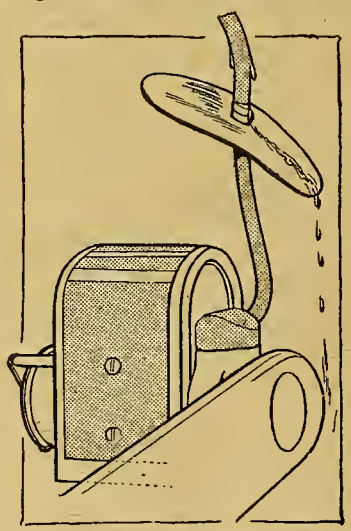


It is quite an easy matter to fix a protector for the control levers.

It is quite a simple matter, and worth the small amount of trouble entailed. When tin is used the edges can be bent down and a coat of enamel given as a finish.—G.E.

WATER ON HIGH-TENSION TERMINAL.

IF water be allowed to accumulate on the high-tension terminal of a magneto a short circuit will be established by which the current can return to earth without jumping the plug points. An umbrella to prevent this can readily be made of a tyre valve patch, or, in fact, an ordinary patch with a hole punched in the centre. If the hole be too large to fit tightly round the high-tension cable a little insulating



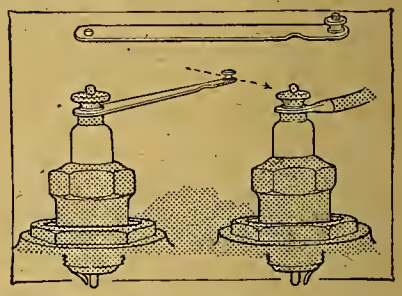
A large rubber patch threaded on the high-tension wire acts as an "umbrella" to the magneto terminal.

tape first wrapped round will make a secure and watertight connection. The water will then drip off the edges of the patch instead of running down the cable.—A.K., Halifax.

EASY STARTING DEVICE.

THE following easy starting tip may prove of interest to readers whose machines are fitted with weak magnetos. The trouble is that the magneto will not give a hot enough spark to obtain a start, unless the engine be turned at an almost impossible speed.

An inlet valve cap is substituted for the exhaust cap, and into this is screwed a spark plug, having a gap of about the thickness of a piece of tissue paper. The other plug over the inlet is set to a fairly wide gap. The lever is a piece of $\frac{1}{32}$in. × $\frac{1}{4}$in. spring brass, having a small ebonite knob at one end and drilled at the other to fit under the plug terminal and spring washer. To



A self-explanatory sketch showing how two plugs with different width of spark gaps can be used to facilitate starting.

start the engine this is brought round to make contact with the original sparking plug, the spark then taking place across the small gap. As soon as the engine fires, the brass piece is turned out of contact, and the firing continues on the wide gap with good slow-running and acceleration.—C.H., Hampstead.

REDUCING COMPRESSION.

THE owner of a fast high compression machine, which may have been built primarily for solo riding, finds it an uncomfortable machine when attached to a sidecar. The dragging weight takes the "sparkle" away, and the high compression, instead of being an advantage, is decidedly the contrary.

Without any trouble the compression may be reduced to quite a perceptible degree by inserting thick washers, or preferably distance pieces with washers at either end, under the valve cap. By increasing the combustion space a less fierce explosion takes place. The power may be very slightly reduced, but the advantage gained easily outweighs that point. Care should be taken to allow sufficient threads to hold the caps securely in the cylinder.—T.S.

A high compression engine can be made more tractable by a few washers beneath the valve caps.

Graphiting Overhead Valve Rockers.

I AM trying graphite lubrication for overhead valve rockers, and it seems to answer admirably. Every practised rider knows that oil does not survive very long in these exposed bearings, which have so bad a name for wear that at least two makers encase them, with some loss of accessibility. I tried smearing mine with a mixture of powdered graphite and oil, and found that the lubricant lasted very much longer than pure oil. I do not see why makers should not fit these rockers with bushes scolloped to hold a permanent serpent of compressed graphite under patents existing to that end.

Spring Frames—A Side Issue.

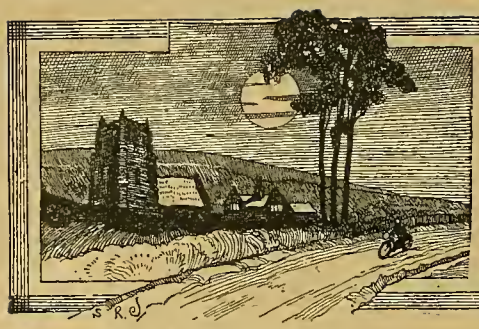
ONE by-product of the spring frame developments will be that small and light machines will acquire greater popularity for long-distance work. I imagine most readers will agree with me that almost any jigger will do for a short run: if you are only going from ten to thirty miles a baby two-stroke, a 2¾ h.p., or a 7 h.p. will all serve your turn, and if you happen to have samples of all the types in your stable, you will usually wheel out whichever you know to be clean, or in good tune, or to have its tanks ready filled. But if a really long trip is in prospect, you will plump for the heaviest machine in the shed, other things being equal, and that for the simple reason that the big 'uns are the steadiest goers, and get their pace at a low engine speed, whereas the burble of a low geared revver becomes obtrusive in two or three hundred miles unless it is really well silenced. Now a spring-framed 2¾ h.p. Douglas, for example, is a very different proposition from a rigid frame of the same make and size over a long run. It is actually steadier than a rigid 3½ h.p., scaling many more pounds. It eliminates the vibration and the whippy sensation characteristic of the little 'uns. Of course, very few spring frames are perfected as yet, and at the best they add unwelcome weight. But things are moving rapidly; before very long the spring-framed little 'uns will be very attractive mounts for prolonged cross-country work, and as they get better and better, there will be an increasing tendency to reserve heavy 3½ h.p. mounts for sidecar duties. In time we may even see a further reduction in touring standards.

Shock from a Sooted Plug?

A CORRESPONDENT challenges a statement in one of our motor cycling manuals to the effect that a shock may be experienced on finger-testing a sparking plug, the electrodes of which are bridged by a fragment of carbon. I leave the point for discussion to readers. Personally, I have not experienced a sooted plug lately, but, speaking from memory, I should say that a shock can usually be got from the terminal. The conditions, of course, present alternative paths for the current: one, *via* the plug and its carbon bridge back to earth through the outer body of the plug; the other, *via* the finger, screwdriver, or other short-circuiting medium, back to earth as represented by the cylinder metal. Popular electrical manuals assert that electricity always selects the "shortest" road home. But I presume that the "shortness" of the road home must be expressed in terms of *resistance* rather than of *distance;* that a short circuit consisting of six inches of steel screwdriver blade, connecting the sparking plug terminal to the cylinder, is, electrically speaking, a much "shorter" path than three inches of plug electrode embodying a $\frac{1}{50}$in. gap of air, and especially so when the air is compressed. Perhaps, therefore, a sooted plug will only give a shock at its outer terminal when the short-circuiting path offers less electrical resistance than the alternative path down the central wire of the plug and across the carbon bridge. Electricians will know how the factor of electrical resistance in these two paths should be compared.

Carburetter Accessibility.

TO judge from one or two examples, recently examined, there is a danger that the attempt to heat the carburetters of twin cylinders may lead to a reduction of accessibility. I do not necessarily mean that there is any serious difficulty in taking down the apparatus, but rather that the job is unduly lengthened and complicated. For example, I was overhauling an engine of this pattern on which the carburetter was heated by a hot air jacket, to which exhaust gases were conveyed by one tiny pipe and released by another. The heating was quite efficient, and resulted in increased power and improved petrol consumption. But the details were clumsily designed. The pipes butted into stub pipe-ends or holes, as the case might be, and were locked by tiny encircling clips, fixed by nuts and bolts. On the road such twiddly bits tend to shake loose, and are easily lost, whilst the inner end of the bolt is jammed against some other part, and is awkward to hold. Moreover, the exhaust gases bring down a good deal of half carbonised oil, which is extremely black and messy, and is apt to leak over the carburetter as a whole. A better plan is adopted on another machine. The hot air pipe in this case is attached without any threading at all; it has chamfered ends, which slip into pipe butts at the carburetter air intake and on the exhaust pipe. There is no opening into the exhaust pipe, but the pipe is circumferentially drilled, so that the air comes off the hot exhaust pipe to start with, and, since the transfer pipe is heated by conduction, its temperature is well maintained. Should the carburetter require dismantling for any reason, the hot air pipe drops out as soon as the ordinary carburetter attachments are cast adrift. The difference in the cleanliness and convenience of the job on these two machines must be experienced in order to be appreciated.



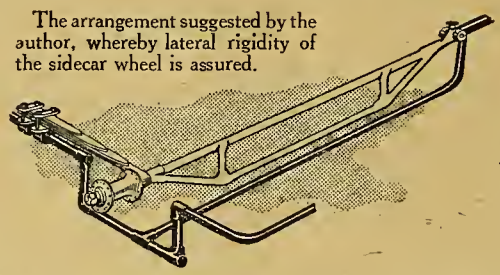
SPRINGING THE SIDECAR WHEEL.

An Illustrated Review of the Different Spring Systems devised, and Some Notes in favour of a General Adoption of Sprung Sidecar Wheels.

THE need for a spring frame motor cycle is generally admitted; equally important is it that the sidecar frame be similarly insulated. By springing the sidecar wheel, two highly desirable objects are achieved. Firstly, the comfort of both the sidecar and the motor cycle to which it is attached is very considerably enhanced—a point which, of course, is obvious on the face of things, though the second advantage gained is perhaps not quite so obvious.

The present rigid type of sidecar is in every way a compromise—especially as regards attachment. A certain degree of rigidity is desirable for comfortable and good steering, yet it has been found that by obtaining too much rigidity one obtains also broken frames or couplings. With one of the War Office outfits extreme rigidity was aimed at and achieved, but it was then found necessary to strengthen up certain portions of the frame (more weight) or breakage was experienced. In other words, the sidecar chassis and couplings must permit a certain amount of yield, for the more rigid the structure the stronger and heavier it must be.

When, however, it comes to springing both the motor cycle and sidecar wheel, all compromises as regards rigidity are removed. The frame can then be absolutely rigid without being excessively heavy or massive about the couplings, for these couplings and the frame throughout are then relieved of half the breaking and jolting strains to which they are normally subjected. The first point in favour of the sprung sidecar wheel, then, is increased comfort; the second, reduced weight and increased rigidity with less likelihood of breakage of the frame members.



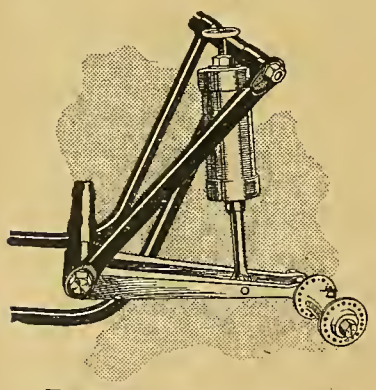
The arrangement suggested by the author, whereby lateral rigidity of the sidecar wheel is assured.

Vertical Rigidity Necessary.

The matter of design for sidecar wheel springing is a more complex problem than at first might appear. At once we encounter the difficulty which so hampers the progress of motor cycle rear springing—lateral rigidity. This is not so vitally necessary in the case of the sidecar wheel as it is in the rear wheel of the motor cycle, but still it is highly desirable, for if the sidecar wheel be lacking in lateral rigidity, it will impose very considerable twisting strains on the rear wheel of the motor cycle. That is to say, the sidecar wheel no longer assists the back wheel of the motor cycle in retaining its vertical position unless it be rigid, and thus, in cornering, the whole of the side stresses imposed by the entire outfit fall upon the rear wheel of the motor cycle instead of falling equally upon the sidecar wheel.

The accompanying illustration, which is almost self-explanatory, shows a system whereby a very wide range of springing is obtained while retaining lateral rigidity and using only one spring. The sidecar wheel is mounted at the end of a floating axle, which is hinged at its opposite extremity, as near to the motor cycle rear wheel as possible. The frame is supported by a laminated spring at the wheel end of the floating bracket, though, of course, the system could be adapted to any chosen form of springing. All horizontal strains are met in this design by the leaf spring, which would be sufficiently yielding to allow for the slight twisting stresses to which it is subjected.

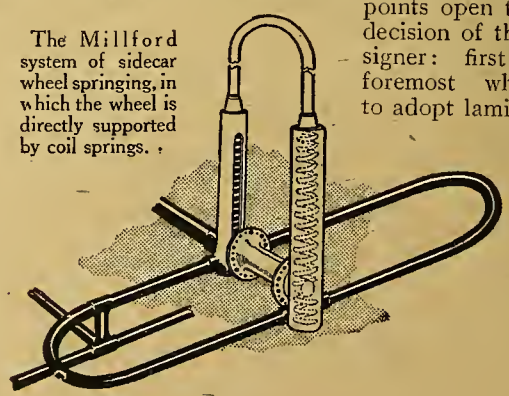
The axle, it will be observed, is arranged to maintain the lateral rigidity of the sidecar wheel, and the mudguard may be attached to the sprung portion of the frame—a desirable point.



The Hercules method, embodying a variable shock absorber, has been in practical use for a considerable period.

Which System of Springing?

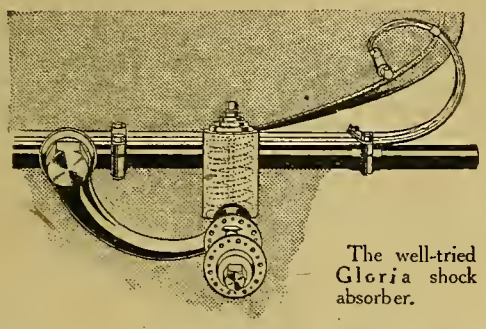
Taking it, then, that the question of vertical rigidity presents no great difficulties, there still remain several points open to the decision of the designer: first and foremost whether to adopt laminated



The Millford system of sidecar wheel springing, in which the wheel is directly supported by coil springs.

Springing the Sidecar Wheel.—

leaf springs or coil springs, the latter being used either in conjunction with some cantilever or bell crank lever system, or directly coupled to the sprung and unsprung members.

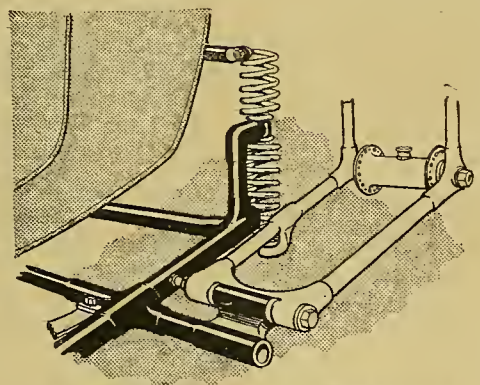


The well-tried Gloria shock absorber.

It is to be observed that some inventors lean towards the laminated leaf spring for sidecar wheels, probably because they have adopted the use of these to the springing of their motor cycle frames and wish to extend the same system throughout, but there is something to be said in favour of the bell crank system, involving the use of coil springs. Let us attempt to weigh up the *pros* and *cons* of each.

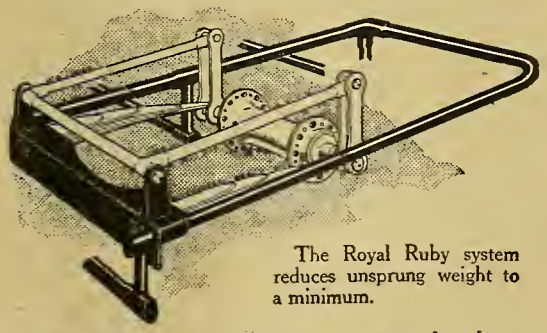
Advantages and Disadvantages

The leaf spring offers one huge advantage in that it affords a point of support and attachment—that is, it is rigid in every direction except in a vertical plane. It is silent in operation, necessitates an absolute minimum of working parts, and is in itself not only a spring but also a friction shock absorber. Its extreme simplicity and rigidity are its chief features, but, on the other hand, it is heavy, costly, and cannot easily be replaced in case of strain or breakage.



The Matchless sidecar wheel springing adds very little weight to the chassis.

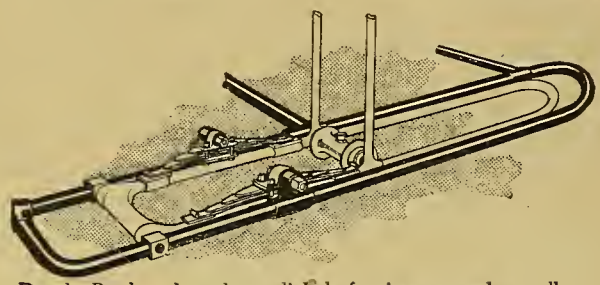
The advantages of the crank and tension coil spring system are that it is light, the springs can quickly be changed (even to suit the load), and that it can be arranged to permit a very extravagant motion—that is, its range of action is considerably wider than that



The Royal Ruby system reduces unsprung weight to a minimum.

of the leaf spring. Its disadvantages are that it exerts resistance in one direction only, so that side strains must be taken by the cranks and the bearings which support them. These bearings would be exposed to wet and grit, and would probably be neglected as regards lubrication, with the result that wear and rattle might confidentally be expected.

Coil springs in direct thrust present most of the disadvantages of the bell crank lever system—unless, of course, the springs be so placed that they are



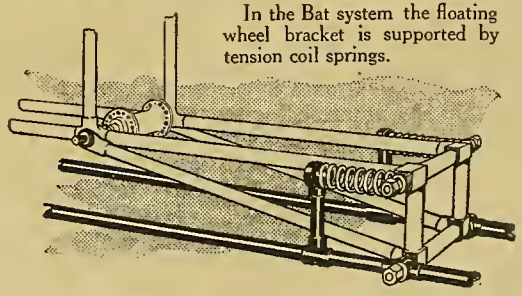
Douglas Brothers depend upon light leaf springs, pivoted centrally, and supporting the wheel bracket on either side.

exposed only to direct tension or compression. Even then a coil spring is very quick in action, and to obtain the steady floating motion imparted by a laminated leaf spring a friction shock absorber working in conjunction with the coil would be necessary.

As to which of the three systems—leaf, bell crank and tension spring, or direct coil springing—is really most suitable only experiment can prove. It may be found that a system giving a very limited range of motion is all that is required for the sidecar wheel, and, therefore, if laminated springs were used they might be short, stiff, and not unduly heavy, so that the likelihood of breakage would be very remote.

That sidecar wheel springing is highly desirable is obvious on the face of things. If we are to have spring frame motor cycles we must have spring wheel sidecars.

To repeat—not only from the point of comfort is total springing desirable, but because it would be a



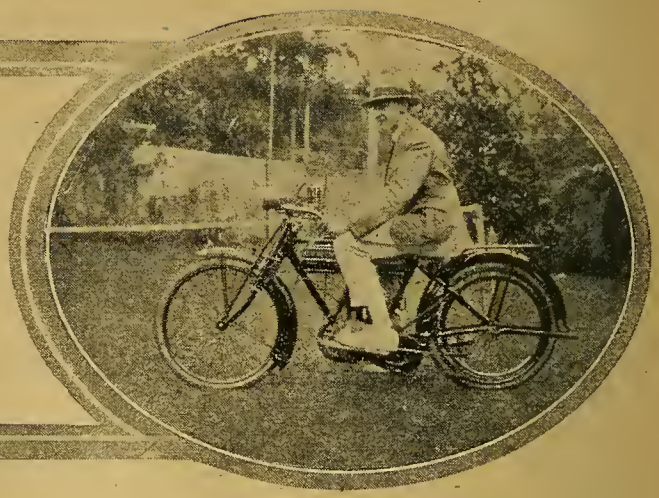
In the Bat system the floating wheel bracket is supported by tension coil springs.

very considerable step in the direction of lighter sidecar outfits, for by adequately springing the sidecar wheel the chassis and the motor cycle frame would be relieved of many breaking strains: an all round reduction of weight would then become possible, and there is no doubt that the suspension of all three wheels would see the last of broken frames. One has only to watch a sidecar travelling at speed over pot-holes to realise the tremendous breaking strains imposed by the unsprung wheels.

CHINOOK.

THE MOTOR CYCLE IN MADEIRA.

Although restricted to the area of this small and beautiful Atlantic isle, the enthusiasm of motor cyclists is not diminished.



MADEIRA is not an ideal country for motor cycles, as is illustrated by the fact that there are but six machines in the whole island. Their makes are as follow: Indian, Enfield, Williamson (all heavy twins), N.S.U., New Imperial, and a nondescript "bosche" of 1½ h.p. with a red tank, yclept Wanderer.

Conditions here are in many ways favourable. What will our brothers on wheels say to a total annual tax at present equivalent to 4s. 3d. per annum? This includes everything, there being no registration numbers to disfigure one's machine.

Petrol from America, at a price averaging 2s. 2d. per Winchester gallon (war price), has been plentiful until recently, though not of the very best quality; but at the moment of writing there is absolutely none to be had. In the way of spares we are entirely in the hands of chance, owing to the total absence of cycle depots. On the other hand, there exist one or two car garages where repairs or replacements can be made more or less satisfactorily.

A very important item to be considered by an intending purchaser is the import duty, which at present stands at 15% *ad valorem*, but may be increased at any moment by five to ten times, there being a movement in the Portuguese Parliament to make the duties on luxuries prohibitive for the duration of the war.

Few Good Roads.

As to roads, good ones in the island are conspicuous by their absence, there being few of length and surface to allow anything approaching a blind. The majority are paved with cobbles, which sounds worse than it really is, for the following reason: Native traffic is almost entirely conducted by means of sledges drawn by oxen, which has the good effect of keeping the roads almost entirely free from dust, and in wet weather from mud, the surface drying in a few minutes after the rain ceases.

The town of Funchal, like many another southern city, has for the most part narrow and tortuous streets, with an abundance of hairpin turns and few side pavements for pedestrians, necessitating circumspect driving. A powerful horn and a good lamp are a necessity under these conditions.

The country roads are considerably superior to those of the town, being of more recent construction, and less infested with ox-drawn conveyances. Here, however, the small boy element is much in evidence, to say nothing of the dog, and it is a toss up as to which of the two is the more objectionable. The former will, on sight, bombard you with his headgear, pieces of stick, or anything that comes to hand, which would cause a delightful smash if it got jammed in the right place. Should you slow down and give signs of making his closer acquaintance he will make himself scarce with surprising alacrity. As to his canine accomplice, his chief aim seems to be to get under the front wheel, and to snap at your feet with ferocious growls.

A Speed Gear Essential.

Owing to the mountainous nature of the island, few of the roads run straight and flat for any distance, thus making a variable speed gear an absolute necessity.

Madeira and the Isle of Wight cover approximately the same area, yet our highest mountain Pico Ruivo is over 6,000 feet in height (compare with Snowdon 3,560 feet). All along the coast are gigantic cliffs intersected with deep ravines running inland, and we boast the second highest sea cliff in the world, Cabo Girao, which has a sheer drop of 2,200 feet into the surf of the Atlantic.

Lightweight Experience.

I had long been keen on having a motor cycle, and snapped at the chance of purchasing a New Imperial, which I bought off a visitor to the island for £38, after it had done about 500 miles. It is the two-speed gear model, and will climb anything in reason, and is just the mount for the place. The heavy twins do not get much chance of showing off, and are wasted in a country like this, though they will climb anything. I have had my 'bus only a month, but have already made several alterations. The first was to remove the silencer and fit a short copper extension pipe. The noise is terrific, but as there are no regulations about it, what matter? It has the good result of making an appreciable difference in power, and clears the road for a hundred yards ahead. My power unit is only 2½ h.p., but I find I can take a light passenger on the carrier, and so have fitted collapsible footrests of my own design for the passenger's benefit.

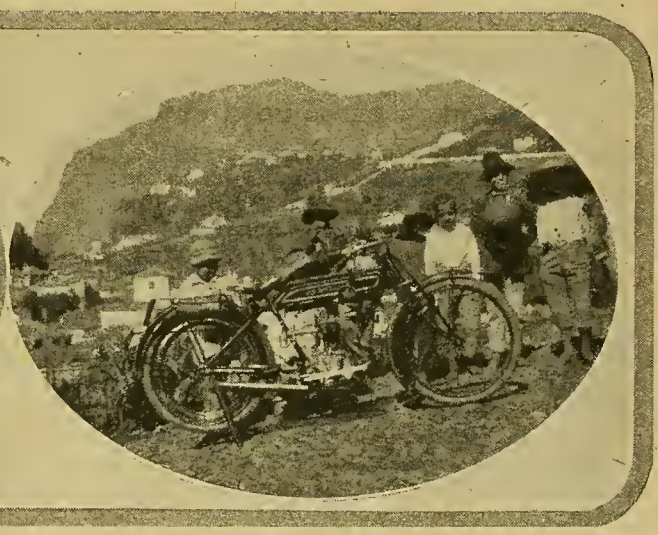
So far fate has dealt kindly with me, and I have had only two falls. One day, shortly after purchasing the machine, on passing through the town I came to a

The Motor Cycle in Madeira.—

corner where water had been running across the road (water coursing aimlessly down a street, fallen-in drains, and other similar nuisances are common). Being still rather nervous, I at once jammed on the front brake, and the next moment sprawled gracefully in the mire; total casualties one broken footboard. Doors and windows flew open, the bicycle engine roaring the while like an aeroplane, and an interested crowd began to collect. I hastened to remove myself, to the evident disappointment of the company assembled, who apparently supposed they had come across something worth watching.

Summer has arrived, and rain need not be expected again until October; meanwhile my New Imperial and I can look forward to pleasant tours of exploration over an island which is one of the most picturesque in the world. R.K.

The Great Headland of Cabe Girao, Madeira. The highest cliff is 2,200 feet, and is the second loftiest sea cliff in the world.



The New Imperial in the village of Cama de Lob attracts the attention of the native rising generation.

LUBRICATION & THE FLAT TWIN.

RIDERS of flat twin engines, particularly riders who are new to this type and who have new engines in hand, need to exercise special care with regard to lubrication, for, in judging by the colour of the exhaust, it is extremely easy to be misled. In the case of a vertical single or V twin the oil naturally percolates out of the cylinder while the machine is standing, with the result that the piston is more or less dry when next the engine is started up. To test lubrication it is then a good plan to give the engine half a pump of oil before setting off, then yank the throttle open and closed and judiciously administer oil till faint puffs of smoke are visible at each sudden acceleration. One is then certain of starting the journey with a proper supply of oil in the crank case, which is half the secret of good oiling.

Recently, on "running in" a new flat, I very nearly ran my engine dry of oil by resorting to the same tactics. When the engine started a goodly cloud of smoke issued from the exhaust, and thinking the engine to be flooded with oil I cut down the drip feed and set off, but only to discover that the engine was on the dry side ere I had gone three miles. I stopped and tried the old acceleration trick, but not a whiff of smoke came from the silencer.

The explanation is, of course, obvious. In the case of the flat twin the cylinders hold the oil, and as the hot piston rings drain themselves, a certain amount of oil is almost sure to find its way into the combustion space—especially with a new engine. This is blown out when the engine is started up, and is apt to mislead one as to the amount of oil in the engine.

CHINOOK.

SADDLES ON SPRING FRAMES.

JUDGING by the illustrations of completed spring frame machines which have been published from time to time, the practice of omitting the saddle springs is on the increase. The seating arrangements usually consist of the moulded leather saddle shape attached direct to the cycle frame.

This is a retrograde step, and, whilst no doubt of value during testing to enable the designer to ascertain the degree of efficiency of his springing device, for all practical purposes it is the mechanical equivalent of $+x - y$.

The demand for spring frames has arisen owing to the increasingly bad condition of our main roads and the necessity of further insulating the rider from such shocks as are transmitted by the rear wheel. Rear springing of the frame may result in the absorption of road shocks, but the absence of saddle springs renders the rider liable to the higher frequency engine and transmission vibrations, which are quite as dangerous in their effects on the human anatomy. In addition, he is robbed of his second line of defence against such jolts and jars as are not absorbed by the frame springs. The spring saddle of to-day is a magnificent addition to a spring frame, and, in place of being regarded as superfluous, will be found to be an acquisition, if not a necessary adjunct. F.E.S.

OVERSEAS SECTION.

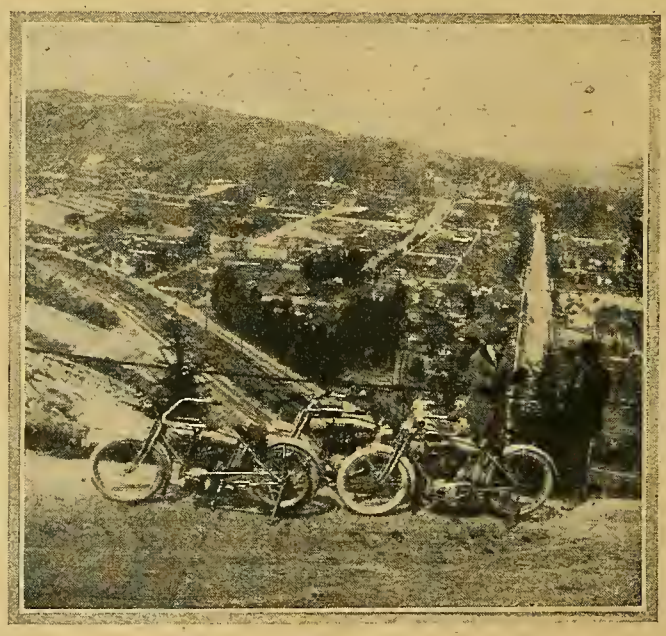
A Commentary based upon Practical Experience and a Study of Overseas Opinions.

Magnitude of the British Motor Cycle Trade.

SOME people—newcomers to the trade—one would suppose, seem to look upon efforts to expand sales abroad as a new move. This is quite wrong. The Overseas campaign of *The Motor Cycle*, which preceded our spring frame campaign, has been spread over a period of several years, and it has pleased us very much to see the rapid and important increase in the value of our exports. Observant manufacturers and users of motor cycles know that exports of motor cycles and parts to the value of over a million and a quarter sterling left these shores in 1914. It is, therefore, somewhat amusing to see that in certain quarters the subject of Overseas trade is being broached as if manufacturers had never thought of exporting a motor cycle hitherto. This is unnecessarily belittling an important trade. Now, whilst *The Motor Cycle* has urged that manufacturers should specialise on Overseas trade and put their house in order with a view to satisfying the special needs of the Overseas man and facilitating the distribution of machines, we are fully alive to the success already achieved and the existing importance of the British Overseas motor cycle trade. Our sole desire is to see it expand and every opportunity that presents itself grasped. As further proof of the absurd inference that manufacturers have only just realised that there is an Overseas market for motor cycles, we may quote the exports for two years only, viz., 1913 and 1914, when the value of British-made motor cycles and parts sent all over the world totalled no less than £2,298,517. These figures are significant, and, it may be observed, are far in excess of America, the chief competitor.

More Overseas Models.

Two more Overseas models—that is, machines built to the specification of the Russian War Office—the Matchless and the James, have been reviewed in these pages since our last Overseas issue. One characteristic point of these wartime machines is their absolute lack of gadgets. The fertile mind of the inventor is not permitted to run riot over their design, as so often happens in peace production. Each is a solid, straightforward, British production, designed and finished to stand the roughest of usage with a minimum of attention. The excellence of the Matchless peace time model is well known throughout the world among those acquainted with the British market, and while the same may be said about the James, it can further be added that the James people were one of the few firms who, prior to 1914, were tackling the requirements of the Overseas rider in all true earnestness. Indeed, the general lay-out of the latest James machine coincided so closely with the requirements of the Russian authorities that practically no alteration was necessary in order to adapt the model to the military specification. The Russian military model Norton is another machine which should exactly meet the requirements of Overseas riders who favour the simplicity of the single, and we are informed that the makers of the Norton anticipate retaining this model for Overseas service after the war. Truly there should be no dearth of excellent machines for the Overseas rider when conditions again permit free and unfettered exportation. In the meantime, Overseas riders, like the boys in the trenches, must content themselves with dreams of what they will ride "after the war," when conditions permit some freedom of choice.



THE MOTOR CYCLE IN CALIFORNIA.

A panorama from an eminence in one of the Los Angeles city parks, where one overlooks the city and the surrounding country. Though the grades on this drive to Elysian Heights are 1 in 5 in places, the motor cycles climb them without difficulty.

A Voice from Overseas.

Oft-repeated Demands.

ONCE again we set forward in bold relief the demands of the Overseas rider, but it can no longer be said that the points demanded by riders abroad are entirely non-existent in British machines. The demands of warfare have done more in the direction of evolving the truly universal motor cycle than could have been accomplished by half a decade of Overseas grumbles, freely aired by the press. Our spring frame campaign has been widely successful, and practically every manufacturer of note has now a spring frame design either undergoing test or on the drawing boards. We have already illustrated many excellent designs, and others we know to be forthcoming at an early date. In the direction of adequate mudguarding and the strengthening and stiffening of wheels, much, however, remains to be done, and there are numerous minor points, such as revisions in hub design, the provision of sufficient kit-carrying space, and so on, which demand attention. On the whole, however, the outlook as regards the suitability of several leading British makes for Overseas use is a good deal brighter than ever before, and it would seem that the stiffest task to be settled after the war will not be in providing potential markets with the articles they require, but in revising our business methods in a way that will enable us favourably to compete with our Allies across the Atlantic. The quality of British machines is sufficiently realised the world over to ensure free demand, but if that demand is to be utilised to the full British manufacturers must waken to the fact that the Overseas purchaser is as justified in expecting straightforward and businesslike treatment as is the man who can make his complaints at the factory door. No business man Overseas is going to buy British machines unless he is assured of business treatment both in the transaction and afterwards—by regular service in spares and so on; for next door to the British agent is the American, who is out for a world market, and who is very fully alive to the possibilities that proper organisation and consideration for customers are bound to bring.

Mr. Tom Silver, of the Egyptian Campaign, Nile Expedition, and Boer War, states the requirements of the Overseas rider from his own varied experiences as a motor cyclist abroad.

A Selection of Letters from Readers scattered all over the World.

British Roads the Best.

S. FERGUSON, Sudan Government Railway, Atbara, Sudan, has not struck a motor cyclist's paradise: "I appreciate *The Motor Cycle* very much; in fact, it is always the first paper I open when the English mail arrives. Unfortunately, there are no motor cycles to be had in this part of the country, and even if there were, they would not be of much use, as there are no decent places to go to, and our nearest town is Khartoum—over 200 miles from here. Motor boats are more in vogue here for use on the Nile. I am keeping all the useful hints found in *The Motor Cycle* for use when I get my next leave to 'Blighty,' and I hope ere that time that the war will be over, so that I can obtain unlimited supplies of petrol, and once again enjoy the pleasures of the open road and a good mount."

Big Singles and Australia.

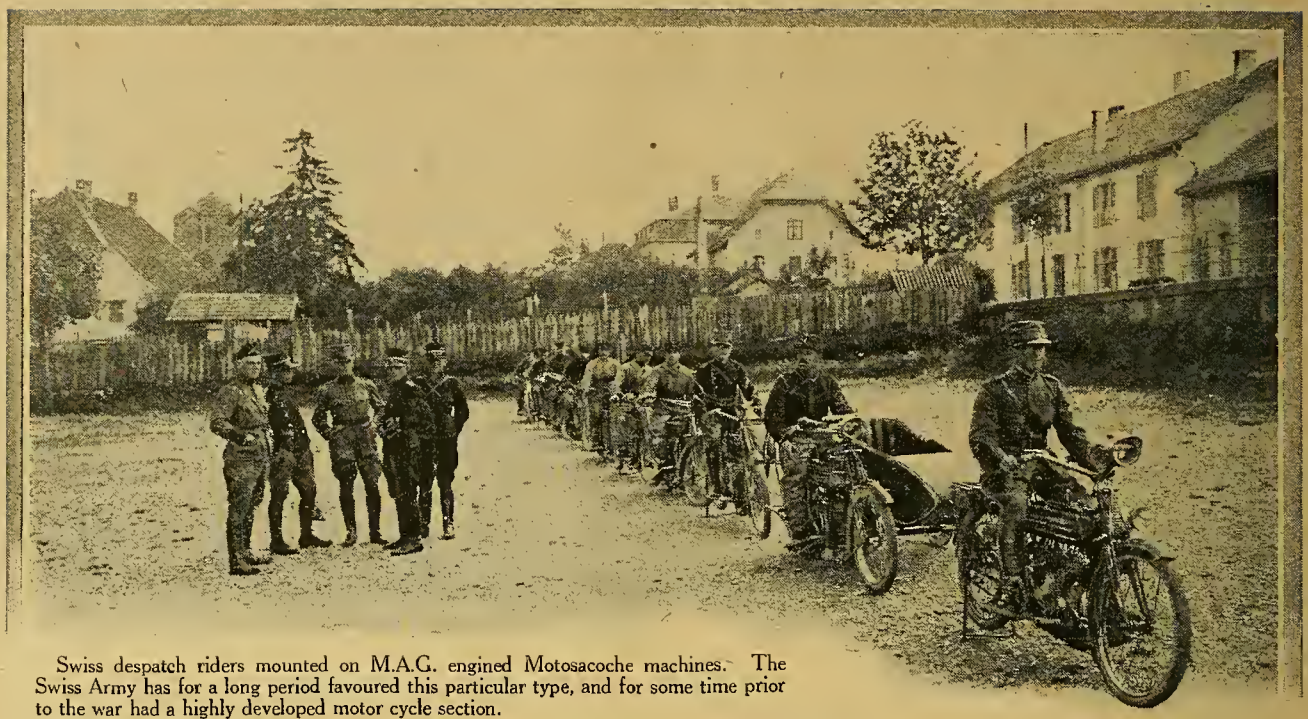
LIEUT. J. L. WRIGHT, 17th Batt. A.I.F., writes: "The 'Big Four' Norton is, in my opinion, the most sensible machine yet evolved for Australian roads; so much so, that I have written and congratulated the designer. The adoption of 3in. tyres will make up appreciably for the lack of a spring frame. The controversy in your paper some time ago, concerning the relative merits of medium and long stroke engines, was amusing—for everything else being equal, the merit of any engine depends upon the area of its bearing surfaces, as any designer knows. The long stroke engine has come to stay, whether it is a high or low compression one. I also cannot agree that the single cylinder will die out; being an engineer, I can appreciate to the full the sweet running of a twin, but I am firmly convinced that the single will not lose much by its lack of smoothness in running. In Australia, engine vibration is nil, compared with road vibration; truly you are blessed with your roads."

Cheaper Mounts Wanted.

MAORILANDER, N. Zealand, comments on the price of British machines: "Having been an interested reader of your excellent paper, I trust you will allow me a little of your valuable space to comment upon the high price of English motor cycles. While motor car manufacturers, especially American, are striving to get maximum efficiency with low cost, motor cycle manufacturers, while striving for efficiency, seem to do so regardless of cost. There is no doubt that the light car is a very dangerous rival to the sidecar combination, and is likely to become more so if prices continue to soar as they have been doing lately. With sidecar combinations selling at £102 in England, by the time freight, duty, packing, agents' profits, etc., are added, it will be seen that the 1917 combinations will reach a price not very many pounds short of the low-priced light car by the time they get here. There is another point which this discussion touches on—that of English and American motor cycles. Can it be wondered that there are so many American machines on the road when it is considered that here an American 7 h.p. three-speed retails for approximately the same price as a 3½-4 h.p. three-speed English machine, while an English 'big six' costs considerably more than an American?"

The Same Growl from Bombay.

FED UP, Bombay, says: "This is a time when British mounts are difficult to obtain, but I hardly think it justifies the high prices charged by some of the motor firms in India. For instance, for a model V Douglas (*i.e.*, without kick-



Swiss despatch riders mounted on M.A.G. engined Motosacoche machines. The Swiss Army has for a long period favoured this particular type, and for some time prior to the war had a highly developed motor cycle section.

starter or clutch) received by a recent shipment £100 is quoted. I do not know what trade discount is allowed in such cases, but the retail price here is practically 100% higher than the retail price of the same machine at home. In the same shop a second-hand 1914 Douglas, which had seen a good deal of wear, was marked £86 10s. A new 3½ h.p. Humber flat twin, which I see listed in the 'Blue 'Un' at £75, is also sold here for £100, which I consider a reasonable figure under present conditions. When I pointed out that the Douglas model V cost about £25 less (retail) than the Humber, I was told it was no concern of mine.

"Is it any wonder that Yankee machines are sweeping the market here when such undue advantage of the situation is taken by local agents for British machines? Another firm here sells 1917 Harley-Davidsons complete with sidecar and latest equipment for £117—only £17 more than the price asked for a T.T. Douglas! If British makers could appoint agents who would handle only their special make of motor cycle and spares, and fix reasonable retail prices themselves, I venture to say it would be to the mutual advantage of the makers and the public."

From a Nairobi Reader.

JOHN P. COOK, Nairobi, British East Africa, writes: "Very little information appears in the various motor cycling papers on conditions prevailing in British East Africa. The following article may be of interest to those who have given a second thought to this country.

"The roads, taken all round, are kept in a fairly good condition by the Public Works Department. The main thoroughfares (about four altogether) are constructed of macadam, and the remainder are of murram.

"These murram roads have a very good surface, and, if properly drained, hold up very well.

"After heavy rains the surface becomes exceedingly soft, and one has to ride very carefully indeed.

"Nairobi, the capital of British East Africa, is subject to very heavy rains, which come on suddenly, and it is no uncommon thing to see some of the main streets momentarily submerged. After the rain has passed the surface dries up very quickly, and traffic is resumed.

"The altitude is about 5,600 feet. Carburetter adjustments are sometimes necessary.

"Ease of starting is greatly facilitated on account of the heat, although the latter is not at all unbearable. Thick oil may be used in the engine, but as the nights are often very cold this makes starting from cold in the morning a little more difficult than if thin oil be used, but thick oil is necessary if a long run be undertaken during the day.

"In pre-war time a buyer was able to purchase practically any make of machine out here, but at the present time only American machines are available.

"The fortunate (?) owner of a British-made machine often has to bewail his misfortune if a spare part is necessary, as such parts are conspicuous by their absence, and it is at least a four months' sojourn for that particular part to arrive from England. He is then fortunate if he finally gets it.

"I have ridden quite a few different mounts out here, my first being a light two-stroke, sold in England for about £28. It carried me a distance of sixty-four miles (quite a long ride out here) without any trouble whatever, and I found it very useful in dodging the traffic in town and easy to control on the soft roads in wet weather.

"My next was a Douglas, and except for a larger clearance between tyres and mudguards, one could not wish for a better mount for solo work around town.

"This clearance is absolutely necessary out here. It is quite common to see three or four machines at the side of the road with their respective riders scraping out the mud, and in the pouring rain!

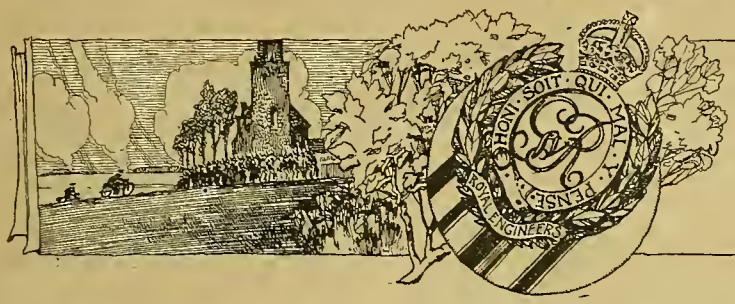
"After this machine I was successful in buying a 4 h.p. Triumph, and consider this in every way suitable for this country. This machine carried me up country where a motor bicycle had never been before.

"Soft roads on 1 in 5 slopes, worn into deep ruts by tropical rains, are met with practically every couple of miles. The rivers are bridged by trees and twigs intertwined, and built by natives, necessitating a stop and a *portage*.

"The two-stroke and other light machines are in the majority among people who use their machines for running about town, and they behave very well indeed. Triumph, B.S.A., Zenith, Clyno, and other well-known makes are among the mediumweight machines, and Douglas, Baby Triumph, Baby Clyno, Indian, etc., figure chiefly in the lightweights.

"One has to realise the fact that the traffic out here is quite incapable of pulling up quickly, and therefore one has not only to avoid running into vehicles, but to ride in such a way as to give them no opportunity of running into you.

"Ox carts and mule carts driven by natives and Indians, and rickshaws drawn by natives, form a great part of the traffic, and the last thing these black drivers think about is putting out their arms if they intend turning."



MILITARY NOTES.

DISTINGUISHING MARKS.

AN officer in the A.S.C., M.T., speaking of the distinguishing marks seen on many of the returned military motor cycles, says:

"These various marks are not placed on the motor cycles to enable the D.R. to spot his own machine. Every ammunition columns has its own private sign, and in fact all M.T. columns have. The O.C. is responsible that these signs are painted on each car, lorry, or motor cycle under his charge. Here are a few examples of signs:

"'Peach Blossom' on D.S.C.

"'Windmill' (winds up) on ammunition column.

"'Black Watch' on ammunition column.

"'Sphinx' on F.A. and W.C."

D.S.O. FOR A MOTOR CYCLIST.

MAJOR W. B. LITTLE has been conferred the D.S.O. in the recent Honours List. For several months Major Little has been in commaud of the 5th Border Regiment, his Colonel being in England on leave through ill-health. The Borderers have been in the thick of the fearful fighting on the Scarpe and have lost heavily. Still, they have more than kept up their reputation for being in the hottest corner. Major Little hails from Carlisle, and will be recalled as a well-known motor cyclist of pre-war days. He made, per motor cycle, several daring asceuts of the highest mountains in the Lake District, which exploits at the time were the subject of articles in these columns.

THE RULE OF THE ROAD.

A MOTOR cyclist in the A.S.C., M.T., Pte N. C. Hodgkinson, writes from France:

"At present I am driviug a 30 h.p. char-à-banc—moving troops and wounded. It is dangerous work at times, and I have had my share of near escapes from shells, etc., but, after all, it is all in the game, and we do it willingly, as it all helps to finish the war, which is our chief aim and hope. Our hours are long, and it is nothing unusual for us to go three or four days with no chance of sleep, and driving practically all the time. When driving at night without lights in pitch darkness just behind the lines, with only the constant flashes from the guns to see the road by, I seem to feel the presence of other vehicles approaching rather than see them, and instinctively move over to my right side of the road to allow them to pass. It seems to be an extra sense that one acquires when doing much night driving, as we do on this job."

CAPT. BALL A MORGAN OWNER.

ONE of our most famous aviators, Capt. Albert Ball, V.C., D.S.O., M.C. (son of Alderman Albert Ball, J.P., and a director of the Austin Motor Co.), recently met a brave death at the hands of the Huns. Capt. Ball, as our readers are aware, downed the record number of enemy airmen, destroying over forty German aeroplanes and a balloon. As well as being an expert pilot, he was also, in a sense, a motor cyclist, and was very fond of his Morgan Runabout, which he used largely when he was in England for the purpose of travelling between his home in Nottingham and various aeroplane works in Bristol, Birmingham, and other towns. Military duty also took him to aerodromes in different parts of the country, and his Morgan was frequently used. Possibly the sensational press would have deprived this gallant gentleman of the fresh air and the invigoration of a fast trip on wheels, had the power been in their hands! Standing in the left-hand corner of the picture reproduced at the foot of this page is Mr. F. S. Whitworth, of the Colmore Depot.

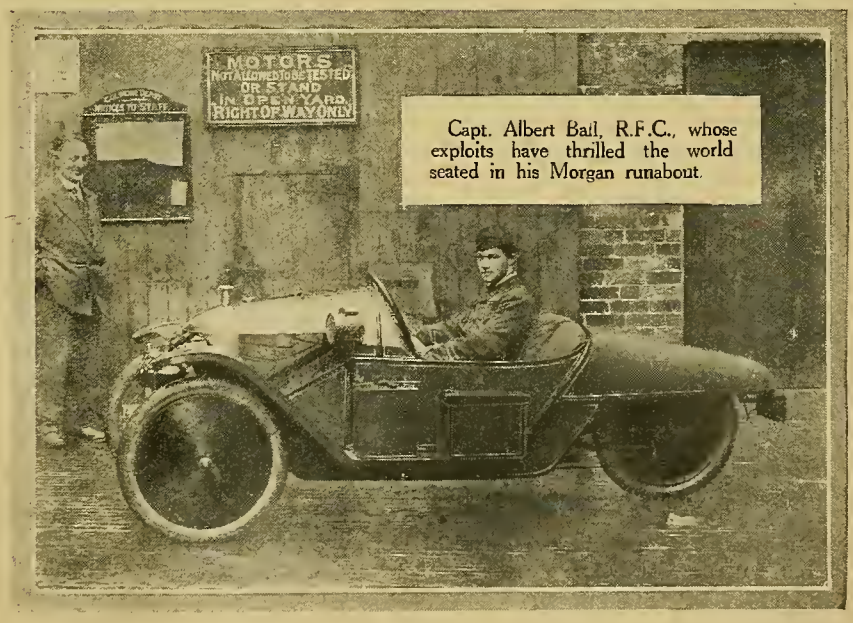
The late Capt. Albert Ball, V.C., D.S.O., M.C.

A WELL-KNOWN DESPATCH RIDER.

HAL HILL, the well-known rider of Bat, Zenith, and other motor bicycles, who competed in numerous competitions in this country and abroad prior to the war, was successful in enlisting as a despatch rider, through *The Motor Cycle*, some little time ago. After a period of training in Bedfordshire he lately left for Overseas.

HOME ON LEAVE.

J. H. POUNTNEY, in peace time a prominent Rover competition rider, was home on leave last week. Enlisting in the A.S.C., M.T., Pountney was attached to the No. 5 Battery M.M.G.S. in November, 1914, and promoted sergeant-artificer, leaving for the Front in the spring of the following year. With his battery, he has had a long spell of trench warfare—sometimes in the first line—and has many and varied experiences to relate. He was lately appointed to an A.S.C. repair base in France.

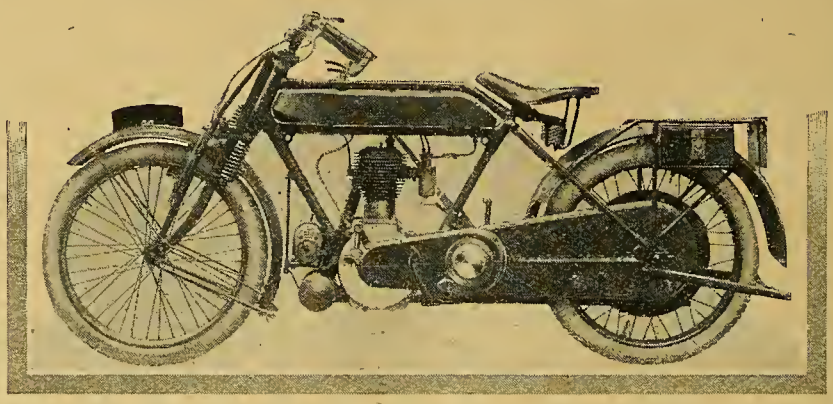


Capt. Albert Ball, R.F.C., whose exploits have thrilled the world seated in his Morgan runabout.

NORTON REFINEMENTS.

ENCLOSED CHAIN DRIVE FOR RUSSIAN MILITARY MODELS.

A GOOD deal of attention has recently been centred round Norton machines, not only on account of their original engine design, the effectiveness of which has many times been proven in public contest, but because these machines belong to a type possessing a very wide range of utility, and which, therefore, are sure to encompass an extensive market. The T.T. Norton, the engine of which is distinct from the ordinary touring model only by reason of the fact that a domed piston is used in place of a flat piston, holds its place worthily among speedy solo mounts, and is certainly an attractive machine for those to whom an occasional speed burst adds to the pleasure of the road, whereas the big touring single is capable of maintaining an astounding average even with sidecar attached. The timing of the T.T. model is, of course, rather different from the touring model, but by reducing the area of the combustion head and skilfully rearranging the timing the experienced tuner would be quite able to obtain T.T. results from any machine hailing from the Norton factory.



The Norton "Big 4" specially adapted for Overseas. Duplicate footrests and all-enclosed chain drive are fitted.

One fact that is particularly gratifying with regard to these machines is that there appears to be very little individuality. We have ridden old Nortons and new Nortons, well-used Nortons and neglected and dilapidated ditto, but in every instance one was gratified by the good old Norton kick and the bark of a well-designed single. Now that all-chain totally enclosed drive has been incorporated, there is no doubt that this machine will obtrude itself upon the notice of many who hitherto have passed it by as belonging to a category in which they are not immensely interested, and we must say that the Russian military model Norton, described fully in our issue of March 22nd, 1917, appeals to us as representing a type of general utility mount likely to gain wide popularity.

Some slight alterations have been made in this machine since last we dealt with it. These are: The total enclosing of the chains, the inclusion of a second pair of footrests further forward than the original pair, so that the rider on a long journey is at liberty to stretch his legs, and the fitting of a magneto shield, which, as the makers point out, is merely a safeguard—not a necessary provision.

The fitting of the chain case is, perhaps, the only point of importance to warrant the attention of our readers, and we cannot say that there is anything specially worthy of note in this fitment. The cases are good, strong, and neat, and, considering that their inclusion is quite a new departure for the Norton factory, they have been thoroughly well adapted. They are well anchored, and permit a reasonable degree of accessibility, an observation port being provided on the underside of the rear drive, so that chain tension can instantly be judged by the insertion of a finger through the port. Still, it must be borne in mind that Nortons, like many others, have undertaken the employment of chain cases to meet hurried demands, and possibly quite out of accordance with their plan of campaign, so that it cannot be expected that these fitments are on the same standard as those which have been evolved with the machine, as is the case with firms who have employed enclosed chain drive for several years past. In one case the chains have been fitted to enclose the drive, in the other the drive and the cases have developed together, and, consequently, have attained a higher uniformity of construction.

Still, we have no doubt that the chain-driven Norton will live up to its belt-driven predecessor, and, as the illustration shows, it would be difficult to find a machine presenting more attractive lines.

TEN YEARS AGO.

IN May, 1907, we exported seventy-five motor cycles and parts to the value of £5,327. Last month—exactly ten years later—as will be seen by the import and export table given on page 570 last week, we exported 819 machines and parts worth £60,850. This huge increase in the midst of war is gratifying, but had normal times prevailed the figures would, of course, have shown a still greater contrast.

A patented revolving inflator was described in June, 1907, and consisted of a pump so fixed that the tyre could be inflated whilst the machine was in motion. Who has not longed for a contrivance of the kind on some hot broiling day when pestered with a leaking tube?

Though this idea was ingenious, its complications prevented it becoming practicable.

"ON LEAVE."

A Short Tour in Yorkshire taken whilst on a Brief Leave from Military Duty.

By BOMBARDIER BURDEKIN.

HAVING the freedom of a few days' leave, with only a meagre allowance of petrol on my permit, the question arose of how best to utilise both the leave and the petrol. Obviously, it was out of the question to undertake an extensive tour; the best that could be done was a series of short trips, making York the centre. One of these runs on the 4 h.p. A.J.S. consisted of a sixty-one mile trip, and was accomplished on a gallon of petrol. The engine ran splendidly throughout.

Leaving the historic city of York by Micklegate Bar, we turned to the right along Holgate Lane to Acomb, and continuing a further six miles reached the village of Marston.

An Old Coaching Town.

A short run brought us to the old coach town of Wetherby, situated on the river Wharfe. This town is half-way between London and Edinburgh, and was a famous stopping place for the coaches in olden days. Leaving Wetherby, with its pretty river scenery, the road leads along a moderate incline to the picturesque village of Spofforth, where there are the remains of the ruined castle, formerly one of the seats of the Earl of Percy. The church is also worthy of note, one of the monuments inside being erected to Blind Jack of Knaresborough, otherwise John Metcalf, who, although totally blind from the age of six, was noted as a clever road maker. He was responsible for the reconstruction of many of the chief main roads of Yorkshire and Lancashire. Crossing the railway, the road continues past Plompton Park to Knaresborough, a small country town situated on the precipitous banks of the River Nidd. This river, although only a narrow stream, has cut out a deep gorge through the limestone cliffs. Carved in the cliff near by is a huge figure of a man drawing a sword, the origin and meaning of it being unknown. This sculpture stands at the entrance to the cave known as St. Robert's, which is supposed to have been excavated in the thirteenth century. Another cave a mile or so below the town is known as Eugene Aram's Cave, and has an unenviable reputation owing to the tradition attached to it. It is believed that the body of a man named Daniel Clark, who was murdered in 1745, was hidden at this spot. The skeleton was not discovered until fourteen years later, when the murderer, Eugene Aram, expiated his crime at York.

"Mother Shipton," the famous prophetess, was born in this neighbourhood in the fifteenth century. It is of interest to motorists in general to know that one of her prophecies was "carriages without horses shall go," to use her own words according to local history.

In the grounds of Studley Royal. The sidecar in the foreground is a 4 h.p. twin A.J.S.

Fountains Abbey stands in these grounds, and the river Skell flows through them.

After a run of five miles the inland watering place of Harrogate is reached, the road afterwards undulating to Ripley. From Ripley we ran into the park of Studley Royal, and past the historical Fountains Abbey, then on to Ripon. After a brief inspection of the Cathedral we made for York again, *via* Green Hammerton and Marston Moor.

CURRENT CHAT

SPECIAL FEATURES

SPRINGING THE SIDECAR WHEEL. OVERSEAS ITEMS OF INTEREST.
CHEAPER POST-WAR MOTOR CYCLES.

TIME TO LIGHT LAMPS

SUMMER TIME.

June 28th	... ...	9.49 p.m.
,, 30th	... ...	9.48 ,,
July 2nd	... ...	9.48 ,,
,, 4th	... ...	9.47 ,,

A Reminder.

There are but two days left in which to apply for a refund of half the local taxation licence. Motor cyclists who must lay up their machines owing to lack of petrol or other causes should apply to a Money Order Office for an application form.

Girl Government Clerks' Motor Cycles.

Two young ladies riding lightweight motor bicycles attracted much attention on the Sevenoaks Road on Saturday. They wore the neat uniform and hats of the girl clerks being engaged for France, with the addition of smart military leather gaiters.

A Useful Road Map.

In the article, "A Four Days' Excursion to Exmoor," by Dr. J. H. Garrett, a very clear section of a map was reproduced. The section in question, it may be observed, was taken from the Michelin map of the British Isles, an excellent production in which the main roads and chief by-roads are clearly marked in red. An ingenious feature of the Michelin map is the method of folding, whereby any section can be examined by opening it merely to the extent of a narrow book. Still another novel feature of the Michelin map is the marking of picturesque roads with a thick green side line. It will be appreciated that an extensive knowledge of roads is necessary to mark picturesque roads with thoroughness.

Russian Military Models.

The 5-6 h.p. twin James three-speed mount, described exclusively in our last issue, brings the range of British motor cycles for the Russian Army to an end. Since these mounts are eminently suitable for general work Overseas, it may be well to repeat here the list of machines and the dates upon which descriptions appeared in these columns:

MOTOR CYCLE.	DATE OF ISSUE.
Enfield	March 8th, 1917
Norton	,, 22nd, ,,
New Imperial	April 5th, ,,
A.J.S.	,, 5th, ,,
Rover	,, 5th, ,,
Excelsior (experimental)	,, 5th, ,,
Sunbeam	May 3rd, ,,
Royal Ruby	,, 10th, ,,
Matchless	June 14th, ,,
James	,, 21st, ,,

In addition to the above list there is a twelfth—the Clyno. We have already mentioned that the Clyno Co. were allotted a large share of the order.

Future of Aluminium Cylinders.

Following last week's article "Aluminium and Air-cooling," two firms have asked to be put into touch with manufacturers who have had experience with aluminium cylinders having cast iron or steel liners.

A Good Suggestion.

A correspondent in this week's issue suggests that the field of war-shattered motor cycles described and illustrated in our issue of June 14th be thrown open to the public, the gate money being utilised for the Red Cross or some other worthy institution. The idea is a good one, and we feel sure that, if carried into practice, the results would be gratifying.

Queries.

Our queries expert begs those who seek advice to remember that we do not publish one-tenth of the queries received. Each query is answered personally, and if it be suitable for publication it is placed in a sacred basket, where all such queries lie, to be used when its turn comes. This may be some weeks after the query comes to hand, and therefore the reader who omits his address, and who writes, "Will you please tell me in your next issue?" is taking grave risks of not obtaining an answer. *If* his query is of sufficient general interest for publication, and *if* there happens to be room for it, it *may* appear according to his request, but he is taking long odds on those two *ifs* and a *may!*

Orpington Motor Cycle Control.

The Orpington control on Sunday was again in operation on the straight road between the village and junction with the Sevenoaks road. A number of motor cyclists were stopped. The police in this district are actively enforcing the silencer and the number plate regulations. In several cases the exhaust boxes and pipes of motor cycles were inspected.

The Latest.

The Motor Cycle evolved the term "flat twin" to replace the mouthful "horizontally-opposed twin." Our sister journal, *The Light Car*, has gone one better—or, at any rate, a correspondent to that journal has made the bright suggestion that the horizontally-opposed twin should be known as the HO2.

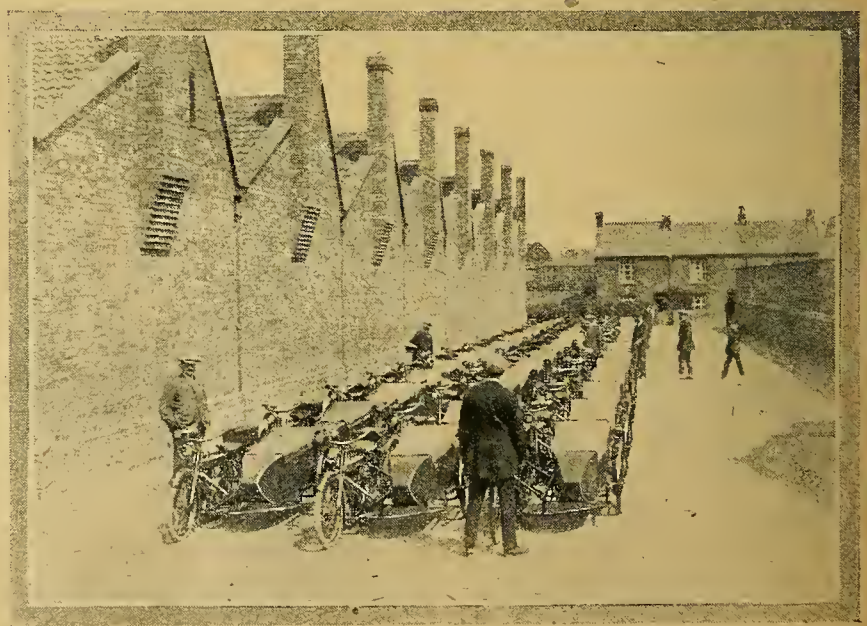
A Motor Cycle for Saxpence!

The Red Cross draw at Newcastle-under-Lyme for a lightweight motor cycle and a Shetland pony is already a definite success. At the week-end 66,000 tickets had been issued, but the number actually sold cannot be determined until the returns are received.

In two weeks 6,300 tickets were disposed of through *The Motor Cycle*, so the honorary secretary informs us.

Still Time for a Ticket.

As the draw does not take place until mid-July, readers should send their sixpences to Councillor Sidney Carryer, Newcastle, Staffordshire. The funds oversubscribed are for a worthy cause.



A batch of 4 h.p. Douglas sidecars ready to undergo the official test. Messrs. Douglas Bros. are now working day and night in order to meet the demands of the Ministry of Munitions.

The National War Funds.

At the week-end the principal relief funds stood as follow :

The National Relief Fund (distributed £3,618,090)	£6,199,520	0	0
British Red Cross Fund	6,934,993	17	6
Tobacco Fund	131,466	19	10

A Globe Trotter.

Mr. J. B. Clarkson, managing director of Messrs. Hope, Gibbons, Sons, and J. B. Clarkson, Ltd., wholesale merchants, of Wellington and Christchurch, New Zealand, arrived in England on Saturday last. Mr. Clarkson is interested in motor vehicles and sundries, among other things, and will make considerable purchases during his visit.

Decarbonisation.

A correspondent states that he cannot get more than 800 miles out of his 3½ h.p. Sunbeam without decarbonisation, and asks how it is that some riders of the same machine claim as much as 8,000. Our correspondent's results are very poor, but we would point out that the 8,000 mark is unusual; it would, of course, be possible to run 10,000 without decarbonising if one were indifferent to the running of the engine, but given good oil and careful handling such an engine as the Sunbeam should do between two and three thousand miles.

A Comedy by Correspondence.

The Vicar of Ramsgill, Yorks, sends us the following extracts from letters he has received from a well-known firm of tyre manufacturers :

June 11th.—"We have received tube for repair, and the work will be done in a few days."
June 15th.—"We have no facilities now for supplying private customers."
June 19th.—"We regret to hear that you have had trouble with —— inner tubes, and shall give the matter careful attention."
June 20th.—"The repaired tube is ready for despatch, and we await payment."
June 21st.—"We acknowledge payment for the tube and enclose receipt."
June 24th.—"We have made careful search and cannot trace having received a tube from you."

Engaging a Driver.

In its leader for June 23rd *The Autocar*, dealing with the above matter, states that, according to the views of one practical motor lorry user, motor cyclists make by far the best drivers. Having had experience with machines of their own, they understand something about the need for economy, while they are more sensitive to any bad running of the engine than men who have never run a machine of their own. Though the lorry driver who possesses his own motor cycle may provide himself with petrol at the expense of his employer, the economy effected, says *The Autocar*, far outweighs this little dishonesty; in fact, until petrol was rationed, the men were put out of temptation by being allowed a certain quantity of petrol for their own machines, provided they kept the consumption of their lorries down to a certain definite mileage per gallon.

It is pointed out that nearly all motor cyclists are mechanics. They must know enough to take an engine down, readjust valves, attend to piston rings, etc. They are also forced to know the simple needs of the magneto and carburetter, and generally to work out their own mechanical salvation. The motor cyclist is a driver because he loves mechanics, but there are plenty of drivers who would be just as happy driving a mangle.

A Record Spring.

A Yorkshire doctor, paying his annual visit to the South by road on his 3½ h.p. Ariel, tells us that not for many years has he seen the country so beautiful, the roads so deserted and liberally strewn with pot-holes.

For Returned Heroes.

We are informed that the central committee of the A.C.U. for the employment of discharged soldiers and sailors will operate from an office at the A.C.U. headquarters, 88, Pall Mall, from now onward. One can rest assured that the Union will look well after those men associated with the manufacture and care of motor cycles.

Adaptation to Circumstances.

A correspondent writes us that his machine runs excellently on the stand, but will not run on the road. Then why not take a house in suburbia, and *run it on the stand* during Sunday afternoon so as to drown the noise of sundry gramophones and numerous newly-born infants?

The Treatment of Glasses in Wet Weather.

To prevent eye-glasses or goggles being dimmed by rain spots in wet weather a good tip is to treat them by rubbing on the glasses a solution consisting of a pinch of common table salt dissolved in glycerine, which prevents drops from forming and renders the glasses perfectly transparent. Unfortunately, glycerine is difficult to get at the present time.

A Board of Trade Announcement.

The Commercial Intelligence Department of the Board of Trade is compiling a directory of British and Irish manufacturers, to be forwarded to consular officers, trade commissioners, and other correspondents of the Board of Trade abroad. Manufacturers who desire to apply for the inclusion of their names should forward particulars to the above branch, 73, Basinghall Street, E.C.2. Envelopes should be marked "Index."

The Mechanism of Machine Guns.

A machine gun has often been likened to a motor cycle by reason of its complexity. The mechanism is just as interesting and attractive to a man of mechanical bent, and those readers who, with an eye to the future, may feel inclined to become acquainted with the mechanism of a machine gun, will find a new handbook just published by Messrs. Iliffe and Sons Ltd., 20, Tudor Street, London, E.C.4, on the "Hotchkiss Portable Machine Gun," of considerable interest. The book is illustrated by line and half-tone blocks, and is priced at 1s., post free 1s. 1d.

A True Patriot.

Among recent members of the Auto-Cycle Union is a venerable patriot who is adjacent to his three score and ten years, but who, since the outbreak of war, has returned to his work in order to set free a young man for the Front. His week is made up of six days of labour and the seventh conducting public worship, and he employs his machine for riding the long distances which he has to cover on each of the seven days.

Handle-bars and Skidding—a Critic.

A member of *The Motor Cycle* staff, who favours the upward sweeping type of handle-bar, and who seldom suffers from side-slip, takes the last passage in "The Critics" article, devoted to skidding, as a personal attack. The Manufacturer agrees that the shape of the bars does not in the least affect the skidding propensities of a machine; but when a skid *does* occur, the matter of recovery depends largely upon the bars.

AVERAGE PRICES.

WE give below the prices of second-hand machines offered for sale in the last issue of *The Motor Cycle*, and in the adjoining column the average prices based upon the latest figures available. Thus the general trend of the market is visible at a glance, though in the first column many blanks inevitably occur. This is due to an insufficient number of one model on which to base an average. The word "combination" indicates a sidecar outfit as supplied complete by the makers.

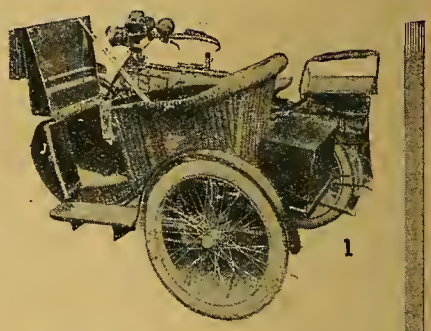
Make.	Year.	H.P.	Average last week.	Previous weekly average.
A.B.C.	1914	3½ 2-speed	—	£40
A.J.S.	1916	6 combination	—	£92
„	1914	6 combination	—	£49
„	1916	4 combination	£79	£77
Allon	1916	2¾ 2-speed	£27	£31
„	1914	2¾ 2-speed	—	£28
Ariel	1915	3½ 3-speed	—	£45
„	1914	5-6 combination	—	£51
Bat	1914	6 3-speed	—	£48
Bradbury	1914	4 2-sp. sidecar	—	£43
Brough	1916	3½ 2-speed	—	£56
„	1915	3½ 2-speed	—	£46
B.S.A.	1916	4½ sidecar	£65	£60
„	1915	4½ sidecar	£58	£50
Calthorpe	1916	2¾ 2-speed	—	£31
„	1915	2¾ 2-speed	£25	£25
„	1916	2¾ 2-stroke	—	£26
Clyno	1915	2¼ 2-stroke	—	£27
„	1914	6 combination	—	£62
Connaught	1915	2¾ 2-stroke	—	£25
Douglas	1916	2¾ 2-speed	£48	£47
„	1915	2¾ 2-speed	£38	£41
„	1914	2¾ 2-speed	£32	£35
Enfield	1916	6 combination	£90	£80
„	1915	6 combination	£63	£63
„	1916	3 2-speed	£44	£46
H.-Davidson	1916	7 combination	£90	£82
„	1915	7 combination	£65	£66
Henderson	1916	7 combination	—	£100
Hazlewood	1914	6 3-speed	—	£39
Humber	1915	6 combination	—	£60
Indian	1916	5 combination	£70	£62
„	1916	7-9 combination	£84	£77
„	1915	7-9 combination	—	£65
James	1916	4¼ combination	—	£70
„	1916	2-sp. 2-stroke	—	£31
Lea-Francis	1916	3½ 3-sp. sidecar	—	£67
Levis	1915	2¾ Popular	£27	£25
„	1915	2¾ Popular	—	£22
Matchless	1915	7 combination	—	£70
New Hudson	1916	2-sp. 2-stroke	—	£28
„	1916	4 combination	—	£48
New Imperial	1916	2¾ 2-speed	£31	£32
„	1915	2¾ 2-speed	£29	£23
Norton	1916	3½ 2-speed	—	£52
„	1915	3½ T.T.	—	£45
O.K.	1916	2¾ 2-stroke	£19	£21
P. & M.	1915	3½ combination	—	£65
„	1914	3½ combination	£51	£52
Premier	1915	2½ 3-speed	—	£28
„	1914	3½ 3-speed	—	£45
Rover	1916	3½ 3-speed	£52	£51
Royal Ruby	1916	2¾ 2-stroke	—	£24
Rudge	1916	3½ Multi	£46	£45
„	1915	3½ Multi	—	£35
Scott	1916	3¾ combination	—	£60
Sun	1915	2½ 2-speed	—	£23
Sunbeam	1916	8 combination	—	£99
„	1916	3½ solo	—	£72
„	1915	3½ combination	£80	£80
Triumph	1916	2-sp. 2-stroke	£36	£36
„	1915	4 countershaft	—	£55
Velocette	1916	2¼ 2-sp. 2-stroke	—	£30
„	1915	2¼ 2-sp. 2-stroke	—	£25
Zenith	1915	8 Gradua	—	£62

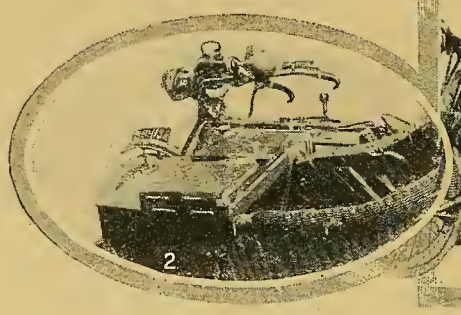
A Home-made Windscreen.

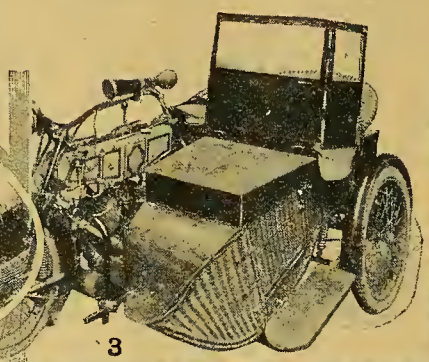
A Sidecar Screen Capable of Taking Four Positions.

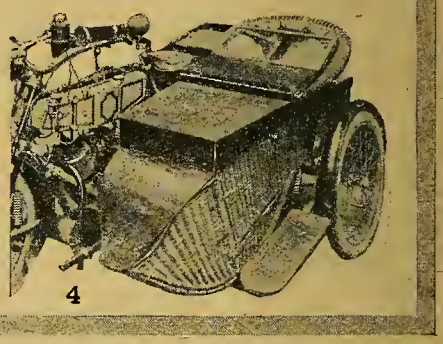
WE have received particulars of an ingenious folding windscreen made in his spare time by Mr. W. R. Gaudie, of 233, Albert Road, Jarrow. The windscreen consists of a hinged top which covers in the open portion of the sidecar, and contains a useful locker, a folding screen, and side wings. When the passenger intends to get in it can be lifted back in the manner shown in illustration No. 1, and it will be noticed that the screen proper and side wings are neatly folded away. No. 2 shows how the windscreen may be folded. No. 3 shows the screen fully erected in such a position that it gives the maximum amount of protection from the elements. Fig. 4 shows how the screen may be laid flat when not required.

Mr. Gaudie sends us particulars of the idea, which, he trusts, may be useful to other readers who like to make things for themselves. He does not pretend that it is a novelty in any degree, but simply puts forward the device in case any motor cyclist may care to copy it. The screen strikes us as being quite effective, and an excellent piece of work for an amateur.







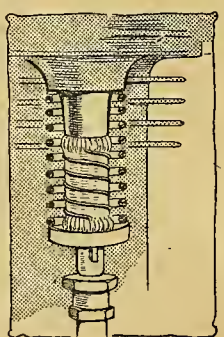


Folding screens are not easy things for amateurs to make, but Mr. Gaudie's attempt appears to have been a success. It is quite an elaborate affair, and has been carried out in a thorough and efficient manner. The wooden shield covering the toe of the sidecar is worthy of note by owners of wicker sidecars.

A VALVE STEM LUBRICATOR.

A SMALL device which will undoubtedly be of value to motor cyclists is a valve spring lubricator, formerly known as the Duco, the patent rights of which have been taken over by Messrs. Brown Bros., Ltd., 15, Newman Street, Oxford Street, London, W.1.

The illustration of the device is self-explanatory, and from this it will be seen that the lubricator is slipped over the valve stem inside the coils of the valve spring. Before being inserted in position it is soaked in oil, and as the tappet moves up and down it causes the lubricant to work its way slowly up the valve into the valve guide, thus ensuring the valve working smoothly and being lubricated throughout the entire length of its bearing surfaces.



The Duco valve stem lubricator.

The presence of such a device will be of undoubted value in a hot running motor cycle, in which the valve stems generally get rather a bad time. It will also add to the life of the valves, and should possess the important advantage of excluding all grit.

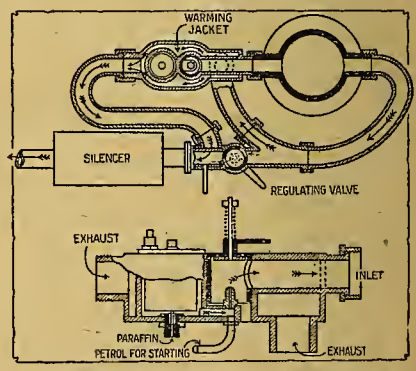
It is interesting to note that the lubricator also serves to soak up any excess of oil which is often thrown up in the case of a splash-lubricated engine. If at any time the lubricator should become dry, the nozzle of an oilcan may be inserted between the coils of the spring and the oil squirted on to the lubricator, which consists of a tubular wick stiffened by a light coil spring.

When ordering the device, the make and date of the machine should be stated, the distance from the end of the valve guide to the spring seat, lift of valve, diameter of stem, and the diameter of inside of the valve spring.

AN EXHAUST-HEATED CARBURETTER.

YET another design of paraffin carburetter, patented by W. Relph, 155, Mary St., Balsall Heath, Birmingham, and which, we are informed, gives excellent results, is here illustrated. The chief principle it embodies is to utilise a very large percentage of the heat discharged from the exhaust to assist in the carburation and complete vaporisation of the fuel used. Not only is the fuel heated while in a liquid state, but also the jet and the induction pipe are surrounded by a muffle through which the hot gases circulate, so that while proper evaporation of the fuel is assured, the common defect of condensation in the induction pipe is properly guarded against. Thus even at low speeds and with the heaviest of substitutes the engine is provided with a clean, dry charge.

It will be observed that petrol for starting is fed straight to the jet, so that an easy start can be made, even though

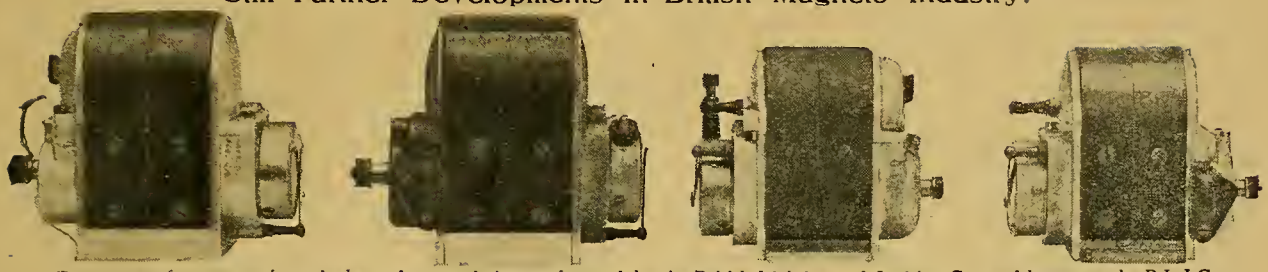


A patented carburetter so designed that the heat from the exhaust can be utilised to assist in vaporisation.

the float chamber be full of paraffin; while, should the float chamber be empty, it is instantly filled with petrol by turning on the tap. By the time the petrol is run off and the paraffin begins to come through, the carburetter is sufficiently heated by the discharged gases to take the heavy fuel.

THE "B L I C" MAGNETO.

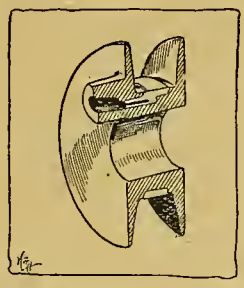
Still Further Developments in British Magneto Industry.



Four types of magnetos (two singles and two twins) manufactured by the British Lighting and Ignition Co., and known as the B.L.I.C. At present the energies of the company are devoted to the production of large magnetos for aero engines.

IN *The Motor Cycle* of June 21st, page 566, we mentioned that a new company had been formed for the manufacture of magnetos under the name of the British Lighting and Ignition Co., Ltd., which is an offshoot of Messrs. Vickers, Ltd. We recently called at the company's premises at 204, Tottenham Court Road, London, W.1, and found there our old friend, Mr. A. E. Bennett, who has been on the premises ever since they were taken over by a magneto firm, and who has had very considerable experience in the handling and manufacture of magnetos.

At the present moment the British Lighting and Ignition Co., Ltd., are carrying on with ten different types of magnetos, ranging from an enormous six-cylinder model weighing 63½ lb. to the smallest size lightweight model, which weighs under 5 lb. The big magneto, though somewhat outside our sphere, is an interesting machine, and it may be mentioned that there are four and a half miles of wire contained in the secondary winding! The magneto has a separate high tension coil, it having been found impracticable in this size of magneto to employ the ordinary type of armature winding.



The B.L.I.C. slip ring, which is moulded in one piece.

In the course of our visit we went over the whole works and found the greatest activity throughout. The company have manufactured from the beginning all their tools, gauges, milling cutters, taps, and dies, as well as moulds for moulding the vulcanite, which is so important a process in the manufacture of a magneto.

Beyond the ordinary vulcanite a new material has been found which can be moulded with the polish on it. There is no rubber in this material, and although it does not give the same insulating properties as vulcanite it is found to be quite satisfactory for certain parts of the magneto.

An example of modern vulcanite moulding was a one-piece slip ring, which was a splendid piece of work. At the present moment some 400 hands are employed, and it is hoped to increase this shortly to a much greater number, while immediately after the war a very large works, employing some thousands of men, will be taken over for the purpose of manufacturing magnetos and lighting installations for the general public.

Very little attention is being given at the present time to the smaller type of magneto, the British Lighting and Ignition Co. devoting nearly the whole of its attention to the production of magneto machines for aero engines.

AN INVERTED VIEW OF CONTROL LEVERS.

ON purchasing a new machine one of my first acts is to remove the inverted controls and all inside wires, fitting ordinary controls and outside wires in their place. I am aware that many riders favour inverted levers and concealed Bowdens, but am at an utter loss to understand why. True, they are neat, and not so likely to catch in one's clothing in a "wait a minute" and often embarrassing manner, but, to my humble way of thinking, the inverted control with its hidden cable and inaccessible and unoilable parts is an absolute *bête noire*.

Recently it has been my unhappy lot to exchange the standard, unbusinesslike bars of two mounts—a flat twin solo and a lightweight—for bars designed with some consideration for the purpose the bars of a motor cycle are called upon to perform. In both cases the task occupied fully two hours, for, owing to the inside wires, resoldering and other fiddling tasks had to be performed. In the case of the lightweight, the inside nipples were rusted solid into the bars, so that a block of wood and a heavy hammer proved necessary, and so that one of the controls was permanently fractured.

A novice, looking at either of these machines now, would probably remark, "What a lot of cables and controls!" Believe me that, in point of fact, there are no more than before. The only difference is that, whereas with the inverted levers the controls were hampered by rust and so on, the whole thing is now an honest and daylight proposition, and one can change the bars or make any other revision one likes in a fifth of the time, and with a fifth of the kit that was previously necessary.

No, the outside control may be described by a few as ugly, but the man who has "had some," instead of condemning the arrangement on such grounds, would probably remark, "Ah! ah! Now we can see what we are getting at." CHINOOK.

WOUNDED SOLDIERS' OUTING.

A Trip through the Wooded Ways of Warwickshire.

THE sidecar continues to play its part in helping to provide change and variety in the somewhat monotonous life of a convalescent soldier. On Saturday last the Foleshill Motor Section of Special Police helped to convey a party of wounded soldiers and naval men from Courtauld's and Longford Hospitals *via* a beautiful circular route to Exhall. On their way they called at Fillongley, where the vicar and school children gave them tea, cigarettes, and flowers. All along the route villagers gave the soldiers a hearty reception.

The contrast in the photographs is striking, and no wonder the change from four brick walls to orchards and strawberry beds is fully appreciated by the men in Saxe blue. The lower picture shows them in an orchard (the strawberry beds not shown) prior to embarking for the return journey.

If the smiles and contented looks on most of their faces are any criterion they obviously anticipate that the ride home will be an enjoyable finish to a pleasant outing. It must be a great contrast for some of the men who have been out for months in the trenches to live this comparatively simple life. It is necessary, however, always to remember that their ready smiles and their looks of physical well-being often hide constant pain and weariness. The makes of sidecars discernible are: Triumph, Humber, B.S.A., and Excelsior.

The sidecars lined up preliminary to starting for the outing through the leafy lanes of Warwickshire.

In the orchard—embarking for the homeward run.

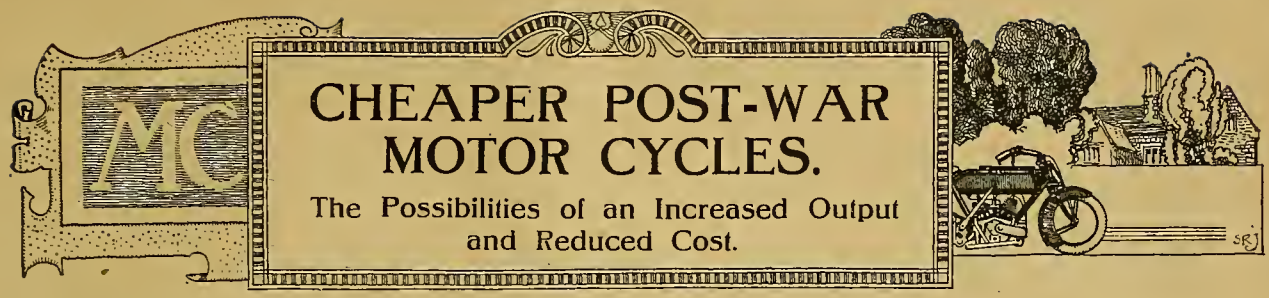
Beware the Motor Cycle Thief!

AS nowadays the art of riding motor cycles is no longer the rare quality it was in the early days of the motor cycling movement, it is imperative, should motor cyclists not desire to run the risk of losing their treasured machines, that they should take the necessary precautions for their safety. Just recently there would appear to have broken out an epidemic of motor cycle stealing, which is not confined to the London district, but is prevalent throughout the whole of the country.

To prevent a machine being stolen from the streets the safest plan of all is, of course, to make it an inviolable rule never to leave it unattended. Where this is unavoidable some means of preventing it being ridden away except by the rightful owner should undoubtedly be adopted; there are various devices on the market having this object in view, amongst them being switch locks, and also strong chains and cables which can be passed through one of the wheels and round some rigid portion of the frame and padlocked.

It is also advisable that all motor cyclists should make an entry in their pocket books of any peculiar marks and means of identifying their machines, especially of all the numbers they may find stamped on the engine or other parts of the transmission and frame.

Those motor cyclists who neglect to protect their property will, in the words of the song, "have only themselves to blame" if one day they find the machine they have left unattended in the street or not carefully locked up and protected at night conspicuous by its absence. C.H.W.



CHEAPER POST-WAR MOTOR CYCLES.

The Possibilities of an Increased Output and Reduced Cost.

WHEN people talk of post-war prices, they generally lay stress on increased production. We have learnt a great deal about organisation and reduced costs; and we have many big factories, which we should never allow to tumble into ruins; consequently, we are practically bound to make more of everything, and to make it more cheaply. This opinion is the natural result of discussions conducted chiefly by producers. The consumers' aspect of the case must also be stated. An extended production will require proportionately increased sales. Nobody can contend, I should imagine, that England is going to be richer than she was, in the sense that the average individual will have more surplus cash to spend on his hobbies. Some individuals may have more "spence," as they call it up in Lancashire, but most of us will be poorer than we used to be; and, if buyers are to be found for these projected additional outputs, I am quite convinced that a lower plane of prices will have to be tapped. In this case, the evolution of really good lightweights is probably the trade's best opportunity; and the second string to its bow should be the evolution of a substantial low-priced sidecar outfit with no frills about it. There should be no very great difficulty in producing a sound £20 two-speeded baby two-stroke, if it is tackled on a really big scale; when once its abilities and economies and quality were proved, thousands of persons who never dreamt of riding anything better than a fifth-rate pony or a push-bicycle would avail themselves of its use. Then there would be no small demand for, let us say, a £50 sidecar outfit, as the next stepping-stone upward; and that would be a much tougher proposition, but if Ford can sell cars in America at £72, we ought to be able to make a roadworthy combination at £50.

Salesmanship.

In establishing the gigantic sales necessary to render possible large outputs of cheap machines, salesmanship will be a vital factor, and here we have something to learn from America. I am not speaking of the sales staff at factories, nor of the methods of agents when they receive an enquiry from a potential customer; both of the above are probably good on the average. I have in mind a marked difference between the British and the American agent. The British agent is too prone to wait for enquiries to come to him; the American agent goes to look for them. This is especially true of rural areas. I spent a holiday last year in a country district where people were making money very freely, where the railway facilities were practically non-existent, and where distances were such that most journeys occupied a whole day. There were two motor cycles in the village, and after making enquiries I came to the conclusion that there were over a score of residents to whom the possession of a motor cycle would spell a genuine economy. If this parish had been located in an American State, several years ago agents would have bombarded these potential buyers with literature, would have called upon them *ad nauseam*, and demonstrated half a dozen leading motor cycles very convincingly, even to the point of giving likely buyers a gratis trial over their own business routes, each of which might have absorbed half a day of the agent's time. Though the local motor agents were not short-handed at that date, they had done absolutely nothing. In the past we have been too prone to wait for business to come knocking at our doors.

Population and Quantity Production.

I suppose the population of the United States is, roughly speaking, about three times that of Great Britain and Ireland; and this vantage is of great assistance in the quantity policy of production. Supposing we essay a similar policy in all our manufactures after the war, we shall need all the help we can get from three main sources, viz., (1) protecting our home market by tariffs; (2) protecting Colonial and Imperial markets by tariffs; and (3) exploiting our home markets to the uttermost, seeing that at the best it is only 33⅓% of America's; and this latter point is not the least vital, seeing that, if an Imperial Tariff Union provides us with a bigger closed market than America's, we should still be at the disadvantage of ocean freights and trans-ocean organisations in respect of at least two-thirds of our output before we equalled America's home sales. Here is a chance for patriotic amateurs to help. I have no inside knowledge of Government projects or trade intentions; but tariffs and quantity production are in the air. If our trade future lies along those lines, it is essential that every resident in Great Britain and Ireland, for whom a motor cycle would be a sound investment, shall make that investment as soon as the war ends; and for patriotic reasons it is up to every rider to enlist recruits to the ranks of motor cyclists.

The Agent's Difficulties.

Quite obviously, a policy of hunting for orders will complicate the whole question of agencies. The present single-handed agent can hardly undertake this type of work. He has to be at home to tackle repair jobs, as they turn up; to do his correspondence; and to sell petrol and accessories. The rural agency often includes local rights for five or six motor cycles, not to speak of two or three cars, sewing machines, push-bicycles, gramophones, and perambulators, besides such small fancy goods as electrical toys. This system

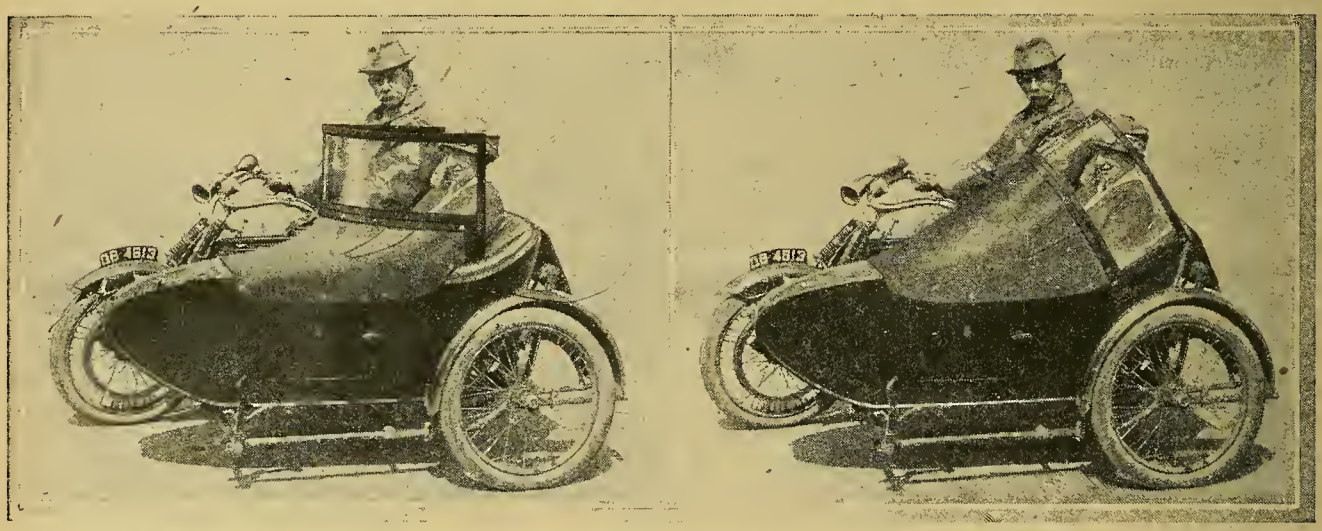
Cheaper Post-war Motor Cycles.—

can never do justice to the huge output of low-priced stuff. If there is to be the home base (garage, repairs, and small sales), supplemented by the flying squadron (the demonstrating traveller), the rural agency in a market town demands a father and two sons, or several brothers, acting in partnership; paid assistants cannot always be trusted. In America a somewhat different plan is often adopted. The local garage will probably hold the agency for the most popular bicycle, and will be very largely a one-man job in small centres. The other bicycles are entrusted to part-time agents; to draw parallels with a British country town, the local postman, insurance canvassers, poultry buyers, etc., would all hold agencies for some of those machines which "don't sell themselves"; they would do their rounds on a sample machine, and would talk petrol at every opportunity as they transact their main business. The firm which thus tested the salesmanship qualities of hundreds of men at very low cost to itself would be assured a constant supply of first-class travellers, over and above the increased output which would result. I must apologise for devoting so much space to matters which are mainly of trade interest; I do it because the future of the motor industry is a matter of prime national importance; and if the radical change of policy, which is so freely discussed nowadays, should materialise with peace, we must all help by becoming unpaid riding agents for the machines which we straddle and admire.

ROAD RIDER.

THE EASTING SCREEN.

A Combination Fitment for the All-weather Sidecar.



A combined windscreen and hood, which can be adjusted by the passenger to any angle between the extreme positions shown.

THIS accessory is unique in that, while answering the combined purpose of windscreen, hood, and storm apron, it is adaptable without alteration to any standard type of sidecar, the matter of fitting being only a few minutes' work, which the purchaser can himself undertake.

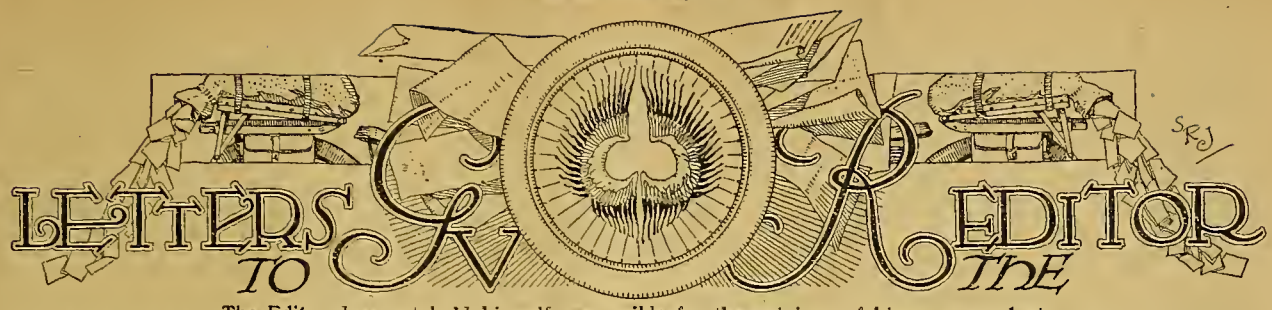
The fitment consists simply of a waterproof storm apron, having a transparent extension which is supported by universally adjustable arms, so that not only can it be raised or lowered, but it can be tilted at any angle, its range of movement being clearly shown in the photographs. In its first position it simply answers the purpose of a dust screen, shielding the occupant of the sidecar from driving dust, but not entirely excluding the current of air. In an alternative position it excludes also the draught, and when fully elevated and drawn right back it answers the combined purpose of storm screen and hood, but does not obstruct the view of the occupant.

There is plenty of room behind this screen for a passenger of average size, and also a child—an important point, since it will probably appeal most strongly to the family 'bus type of sidecarist. It is really an excellent fitment for all-weather winter and summer purposes. The makers are Easting Windscreen Co., 79, Colmore Row, Birmingham.

OIL PUMPS FOR AUSTRALIA.

THE Motor in Australia says: "The Americans are far ahead of English makers so far as oiling systems are concerned. Why on earth a glass tube is fitted to an oil pump is beyond comprehension. It is neither use nor ornament, and a source of annoyance through breakage. A small all steel pump is badly needed."

Quite right so far as it goes, but *does* any British maker to-day employ a glass tube for his oil pump? Surely the method was superseded years ago, so can it be possible that our contemporary has confused the glass tube "sight" of certain drip systems with the pump? An "all steel" visible drip would certainly be an entertaining instrument.



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

AN APPRECIATION OF THE P. AND M.

Sir,—I read in your issue of June 21st an article entitled "An Appreciation of the 3½ h.p. P. and M.," and I feel obliged to write a few words to supplement "Wasp's" statements regarding the speed capabilities of this interesting machine. I always used to believe that this machine was slow, but I have been living recently at Norwich, and have noticed that the Flying Corps despatch riders use these machines, both solo and sidecar, and they do not "half" make them go. D. KENNEDY.

A LUDICROUS DERANGEMENT.

Sir,—I am sorry Mr. Sharp and I do not see eye to eye on the causation of this trouble. I should think it will be generally admitted that a sluggish contact breaker allows of reasonably easy starting and slow running, but imposes a limit on the speed the machine will attain.

On the particular machine which first demonstrated the symptoms to me, the silencer was merely an apology, thanks to my efforts on it with a hand drill, and, as it was originally of a-type that is known for its good scavenging qualities, I considered that I had eliminated back pressure as one of the possible causes.

In addition, the effects of back pressure from throttling of the exhaust would be more noticeable when climbing than when running on the level, yet the characteristic symptom of this derangement is good climbing and poor running on the level.

I hope that the gentleman who gave the original problem to "Ixion" will let us know *viâ* the columns of *The Motor Cycle* when and how the cure has been effected. It will be very interesting reading. I still plump for the contact breaker as the culprit. ALEX LINDSAY,
B.E.F. Capt. R.A.M.C.

WAR-WORN MOTOR CYCLES—PUBLIC EXHIBITION SUGGESTED.

Sir,—The remarkable photographs in a recent issue of *The Motor Cycle* must have been recognised by readers who travel to and from the City on a certain line, the dump of machines, as pointed out, being situated in an open field skirting the line.

I overheard an excellent suggestion from a motor cyclist the other morning—that the public be admitted. The Red Cross funds would benefit considerably, as the visit would be worth quite a long journey.

Thousands lately crowded around a damaged Verdun ambulance car in the West End. This wonderful show of motor cycles would be much more interesting than "Zepp" relics and the like.

It is a pleasure to hear that so many of the machines may be restored fit for further service.

PERMANENTLY AND TOTALLY DISABLED.
Bromley.

OVERSEAS REQUIREMENTS.

Sir,—This Association proposes to issue to its members monthly a confidential bulletin. One of the leading motor journals has enquired whether in this connection we should wish to have forwarded to us copies of letters received from firms desirous of taking up agencies for British cars, commercial vehicles, motor cycles, accessories, etc. We have replied to the effect that we shall be glad to be notified of all such enquiries, with a view to communicating them to our members through the medium of our bulletin.

I have thought it advisable to write you on this subject, as no doubt you receive from time to time enquiries of this kind. I should also like to take this opportunity of mentioning that at any time we should be glad to receive communications of a critical character indicating the special types of vehicle required for specific Oversea markets, and reasons why British vehicles have not in the past filled those markets to the complete satisfaction of local motor users. Critical communications of this kind could be mentioned in our bulletin, and retained at the offices of this Association for private inspection by any one of our members who might be interested. HORACE WYATT,
Secretary, The Association of British Motor and Allied Manufacturers, Ltd.

BELT WEAR.

Sir,—I have been interested in the letters of "A.J.B." and "Cymro" about the damage done to belts by the chippings which are strewn on newly tarred roads. Recently I was riding in Cheshire, and struck about a mile of newly tarred surface with a sprinkling of small chippings; and, wanting to make good time, I was travelling at a fair speed. When I arrived at my journey's end (Brixton) I too found a practically new Dunlop belt almost ruined. There was rubber torn off to the canvas for about a foot in the middle of the belt. The only preventive is to travel slowly through it and for some little distance after leaving it behind. J. MILNER.

SHOCK ABSORBERS.

Sir,—In the article on shock absorbers (transmission) I am afraid that your contributor has committed as fatal a blunder, with his suggested design, as did "Ixion" when, in the days long ago, he perpetuated his famous howler in suggesting that we should drive our speedometer off the magneto transmission.

A moment's thought will convince your contributor that his suggested slipping clutch would only be applicable to single-geared machines, since, occupying a position in the final drive, its area and adjustment would require to be such that excessive slip should not occur, even when subject to the maximum engine power delivered through the lowest gear. It will be evident, therefore, that at low engine speeds, on top gear, the device would be inoperative.

In the case of single-cylinder machines, slipping clutches or shock absorbers are necessary only for the purpose of easing transmission shocks at low engine speeds with the top gear in operation, for even at the slowest road speeds, in low gear, the torque is sufficiently even to render any other device than the driving clutch unnecessary. It follows, therefore, that the shock absorber should occur in the primary drive, so that it will operate or remain idle automatically as the driving conditions demand.

Buffer-spring devices on either engine-shaft or rear hub are unnecessary complications if a suitably designed main transmission clutch be used, and in this we might profitably copy the Americans, who equip their machines with a clutch of sensible dimensions and arrange a suitable hand lever so that any required amount of slip or shock absorbing effect can be obtained or varied at will whilst driving.

The after-the-war type hinted at by "Chinook" is a very expensive design with wearing parts, and, in consequence, despite its efficiency, will certainly not tend to become popular; moreover, it occurs in the final drive, and therefore its weight and strength must be reckoned from the wrong end of the scale. WHARFEDALE, A.S.C., M.T.

ERRATIC RUNNING OF 4¼ H.P. ENGINE.

Sir,—I have never written to you before, although I have been a reader of your excellent paper practically since its first number. I notice in your issue of May 31st, in the correspondence columns, a letter from a reader under the heading of "Erratic Running of 4¼ h.p. Engine," and having had a similar trouble myself with a well-known 3½ h.p. make of machine some years ago, I think I can solve the problem and suggest a remedy. The symptoms of my trouble were identically the same as with the machine of Capt. Nias—namely, when descending an incline feeble firing, muffled explosion, then misfiring, and finally complete stoppage, with difficulty in starting again without copious injections of petrol. I diagnosed the trouble with my machine as follows: When descending a hill with throttle closed or nearly closed, and machine overrunning engine, oil from the crank case was sucked past the piston rings, which were worn. The vacuum in the cylinder acted as a pump, drawing the oil up on to the piston, which in turn threw it on to the plug, causing a short circuit and consequent stoppage. I completely cured the trouble by fitting new piston rings.

B.E.F. N. C. HODGKINSON.

PETROL ECONOMY.

Sir,—In *The Motor Cycle* of June 14th appears a letter by Mr. A. Wood, concerning the petrol consumption of the Velocette. The writer asks, "Do the makers express any opinion, or have they fortunately struck everything just about right?"

As makers of the Velocette, we wish to point out that the remarkable petrol economy of our machines is not a fortunate accident, but is entirely due to careful design. We do not attribute our success to any particular item in the construction, but rather to the general excellence of the design and lubrication system. The designer, Mr. Percy Taylor, has had a long experience with petrol engines, and would not hesitate giving information to other manufacturers with a view to reduce consumption of petrol were it possible to do so by simply pointing out one particular item in the construction. In designing the Velocette, he balanced up the advantages and disadvantages of a two-stroke, and tried to strike the happy medium. He considers that efficient lubrication makes (as in all other engines) for economy in petrol. Add to this correctly designed ports, cylinder, shape of piston head, piston clearance, position of plug, gauze in transfer port, *désaxé* of cylinder ¼in., air-tight crank case, and last, but not least, ratio and bore of stroke, and you have the secret. Post-war models will reveal still further improvements in economy, both in petrol and oil.

VELOCE, LTD.

SPARKING PLUG DESIGN.

Sir,—May I trespass on your space to reply to the letters appearing in your issues of June 7th and 21st?

Mr. A. Ward doubts the fact that electrical resistance rises as the temperature of the conductors goes up. The most elementary manual on electrical engineering will remove this doubt. Further, if his contention were right the spark would only occur at one place. This, as I have stated, is not so.

He also says the four-point type would heat more readily in a Bunsen flame than a single-point. This may be true, but it would cool more readily, too, when removed from the flame, and so nullify this. However, the heat I referred to was not the heat of the explosion, but that of the spark. A four-point Bosch has not sooted up with me, and single-points have "bridged" several times. Surely it is apparent to Mr. Ward that the more you build in from the plug body, the hotter the parts must become, and the further the heat has to be conducted

"W.F.W." assumes that I have given the Bosch plug a very limited testing. With regard to the number of plugs tested this is true. I have not had to replace them, except when I have given them to friends to cure plug trouble. As regards miles run, it is not true. I have used them for many thousands of miles.

It is not the insulator that I wanted our makers to copy, though I have no complaint of this. On two plugs, when tested with oil while the engine was running, traces of bubbles were noticed at the junction of insulator and body. This was easily and permanently cured by caulking the body down, using the V of a cold chisel for the purpose.

For myself, I prefer to give the devil his due, and I am of the opinion that it is better to get to the journey's end with a Bosch than to be stuck halfway with others.

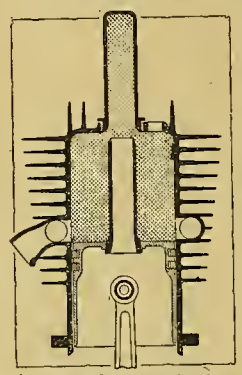
The great advantage of the open-ended plug body—no matter what type of electrode be used—is that the latter can be readily removed and the insulator properly cleaned. The bits of wire, pressings, washers, etc., with which some makers like to close up the end of their plug bodies, must get hotter than the body itself, and they get in the way when cleaning the inside of the plug. In fact, with many plugs it is impossible to remove the central electrode till these excrescences have been bent or broken off. H.B.

Harborne.

TWO-STROKE DESIGN.

Sir,—With reference to the recent discussion in *The Motor Cycle* on the subject of two-stroke design, and particularly to the letter of Lieut. Hamilton in the issue of May 24th, I am enclosing a sketch of an idea which has occurred to me as a suggested improvement on Lieut. Hamilton's design. I do not know whether the idea is old or not, but in any case it may be of some interest to your readers.

The piston carries an extension tube open at both ends, which fits into a corresponding tube on the top of the cylinder. The mixture is drawn into the crank case in the usual way, and at the bottom of the stroke passes up through the piston tube, which withdraws clear of its sheath into the top of the cylinder, as shown. The exhaust gases are driven out through ports in the circumference of the cylinder. In this way an overhead inlet can be used without the complication of valves, springs, cams, etc. There would probably be less mixing of the inlet with the exhaust gases than with the ordinary deflector type of piston head, thus conducing to greater economy, and, in addition, the inlet mixture would be warmed by contact with the hot piston and cylinder tube before entering the cylinder. I think that this design would possess the advantages of Lieut. Hamilton's design without its disadvantages of valve mechanism and long transfer pipe. The only difficulty, as far as I can see, would be the lubrication of the piston tube in its sheath. E. AVERY ROFF.



A two-stroke piston having an extension tube open at both ends.

BALL BEARING CONNECTING RODS.

Sir,—Under the above title, in your issue of June 21st, there is a letter from Picardy Pitt, in which he points out that rotary engines are all engines of the reciprocating type, and proceeds to show that they do reciprocate.

It is the first time I have written to you, and have been a reader of your paper for some six years, but as I am very interested in this type of engine, I feel it calls for some comment.

In the rotary engine only the effect of a reciprocating motion is produced. In the stationary engine, the piston accelerates from rest to a maximum, and then decelerates to rest again, repeating these once per stroke. Your correspondent says that the pistons of the rotary engine are all driving on to one point which is fixed concentrically to the centre of the engine given. He, however, seems to lose sight of the fact that the connecting rods of the piston form radii of a circle—the centre of which is the crank pin—the circumference of which may be said to be formed by the pistons. It will be easily seen that the piston-circle (if it may be so called) is eccentric, and not concentric, to the cylinder-circle. Both the *pistons* and the cylinders revolve in a rotary engine, each about a given fixed point. Both cylinders and pistons describe true circles, eccentric to one another. In this way a reciprocating *effect* is produced, but as the pistons, when in motion, never come to rest as they do in an ordinary stationary engine, they cannot be said to reciprocate. The rotary is, therefore, not a reciprocating engine. PIP-EMMA, R.F.C., D.R.

[Our correspondent has put the case very lucidly, and we must say that we agree with him.—ED.]

MOTOR CYCLISTS IN THE R.F.C.

Sir,—Twelve months ago I paid a visit to Coventry to try and enlist in the Motor Machine Gun Corps. Unfortunately you had a telegram from the War Office to stop recruiting for this section. You were, however, good enough to get me into the Royal Flying Corps. It is through this letter that I wish to show my appreciation of your kindness. I am getting on very well, having been recently promoted to 1st A.M. I may say that your paper has proved very useful to me in gaining valuable information.

SEVEN YEARS' READER OF THE "BLUE 'UN."
Bradford.

FRONT HUB DESIGN.

Sir,—Having noticed articles in your recent issues of *The Motor Cycle* relating to "hubs" and "discs," I should like to submit my ideas, which have had fair trial.

Apropos the former, I am a great believer in the distance pieces fitted on some recent mounts and illustrated in the "Blue 'Un," and have used similar fitments for some considerable time, with outside cups. I also fitted a small leather washer, shaped like a pump washer, with flange inside, and touching the spindle. This was lubricated with thin grease. After various trials in exceptionally bad weather, this contraption seemed quite water and mudproof. Add to this well-designed roller bearings (adjustable), and that is my hub every time.

On the same machine (3½ h.p. single, dual purpose) I fitted discs, but, after trials, discarded the front disc, retaining the rear and sidecar ones. The machine (to me) did not seem ugly, and had the advantage of being easily cleaned, while in the worst side winds the steering was O.K. (with or without sidecar).

W. J. CLIFFORD CORKE (Cpl., M.T.)

WANTED, A GOOD LIGHTWEIGHT.

Sir,—Having noticed the letter of Mr. Fuller in *The Motor Cycle* for June 14th, I should like to say a word for my 2¼ h.p. two-speed Calthorpe motor cycle.

Purchased last year, the machine has given me practically no trouble. I think I am right in saying that at the time of purchase it was the cheapest two-speed mount on the market, and its running has been excellent. The part of Kent in which I live is extremely hilly, and it conveys some idea of the hill-climbing power when I say that for several weeks past I have been without my low gear (having broken the chain) and yet I have never been beaten by a hill. I have seen letters in *The Motor Cycle* asking for routes which avoid River Hill. My machine will climb it on top gear!

The Enfield gear is extremely useful, especially in traffic, as I can bring the motor cycle to a standstill in free engine, and then smoothly start away "like a big car," as admirers of the bicycle have told me.

My average speed on the very hilly Kentish and Sussex roads during short runs is about 28 m.p.h., and the consumption approximates to 90 m.p.g. Usual disclaimer.

C. W. SAYERS.

A VARIETY OF CONDITIONS FOR DESPATCH RIDERS

Sir,—I would esteem it a favour if you could spare the time to read these few lines *re* your correspondents A. A. Jackson, G. Hammond, A.S.C., D.R.'s, and also "Sub," in your issue dated April 19th. I notice that they write in awed tones of 16in. and 18in. pot-holes on main roads. If that is all they have to contend with, then I am sure that all the boys out here would very much like to change places with them. I wish that they could ride in Palestine. There are no roads here at all, much less main ones. All riding is across country, and this is intersected by a network of gulleys, ranging anything from four feet to twenty feet deep. The country in some parts is also cultivated, and riding through half a dozen ploughed fields is an everyday occurrence. Believe me, if we can strike a camel track twelve inches wide and solid ground we are as happy as sandboys—which, I suppose, is what we really are. Can your correspondents in France imagine riding at night without lights in country like this? I think not. "Sub." asks the question, "Can you imagine the front wheel of a motor cycle dropping in an 18in. pot-hole?" We can, and not a few of us have been on the Western Front in France and know which we prefer. MILK AND HONEY.

E.E.F.

THE IDEAL MOUNT FOR LADIES.

Sir,—I notice that in your issue for June 14th you request readers to state the type of motor cycle which is, in their opinion, the most suitable for lady riders who are taking up work of national importance.

Well, in my opinion, a 2¾ h.p. two-stroke with two or three-speed countershaft gear would completely fill the bill when the ground to be covered did not include freak hills of the Nailsworth Ladder type.

In such a machine one gets simplicity, reliability, and, if the machine has been carefully selected, accessibility. This latter point, however, is one that many makers seem to ignore. In the two-stroke engine one has a minimum of reciprocating parts—no mechanically operated valves to stick or cause trouble in any way. The only attention necessary is a periodical decarbonisation of the cylinder head and exhaust port, and now and then a clean out of the silencer and exhaust pipe—an operation which needs to be more frequently carried out than with a four-stroke engine, as free exit of the exhaust gases is of much greater importance on a two-stroke.

With a combined petroil and semi-automatic drip feed lubrication system the efficient lubrication of the piston and bearings is assured, and when the right sitting of the drip feed needle valve has been obtained no trouble should arise from this source.

The feminine rider generally requires for such work a machine which gives the maximum of service with the minimum of attention, and I certainly think that a machine as outlined above is the ideal type. A. G. DAVIES.

GUDGEON PIN FIXING.

Sir,—Referring to the recent article and letters on the above subject, I see no reason for bushing the piston bosses, provided the pistons are of the generally accepted pattern.

Some little time ago I lent my motor cycle to a friend, who allowed the little end of the connecting rod to seize the gudgeon pin, or *vice versa*. The gudgeon pin (which was a tapered one with rather a loose driving fit, had copper washers at each end to prevent it scraping the cylinder walls) then continued frictional movement with the piston bosses instead of the little end with quite satisfactory results in so far as wear was concerned. Lubrication must have taken place by the lateral shifting of the gudgeon pin, accompanied by capillary attraction, the copper washers preventing the oil running out at the ends.

I had a four-cylinder car which I ran 11,000 miles odd in this (Monmouth) very hilly country with the gudgeon pins fixed to the split connecting rod ends by means of a bolt through each split end. This car has now run another 10,000 miles or more since I sold it, and there is no perceptible play in the piston bosses (cast iron unbushed). I have often wondered why this system has not been adopted by motor cycle engineers. One gets much more bearing surface, the gudgeon pin needs no tapering or driving fit, and the piston is therefore less liable to fracture in handling or to distortion during running.

The only possible objection I can see to N. Smith's method of fixing is that the small set screws in the little end of the connecting rod would probably, I should imagine, some time or other get tired of the wobbly position they are forced to occupy, and want to play amongst the big ends and any other suitable place for doing mischief.

With regard to frame design, some years ago I saw three Dursley-Pedersen cycle frames fitted up with 2, 2½, and 3½ h.p. Minerva engines respectively. I also met one on the road being ridden by Mr. Pedersen himself. Doubtless the rider was not very comfortable on a small cycle saddle, with small tyres, etc., but the point I wish to demonstrate is that a scientifically designed frame, if constructed of proper material, will stand road shocks that would break up another frame twice its weight not so designed and constructed.

Nine or ten years ago or thereabout I owned a 2½ J.A.P. engined motor cycle which weighed all on, including some petrol, spare tyre, accumulator, etc., less than 112 lb. on the scales at the famous Birdlip hill-climb.

I ran that motor cycle three years or more without a frame breakage, and then sold it. A subsequent purchaser attached a light sidecar to it, and ran it for some while with satisfactory results. The frame of that machine was constructed on proper lines, with straight tubes to the main frame, and the then usual kink for belt purposes. C.A.F.

Monmouth.

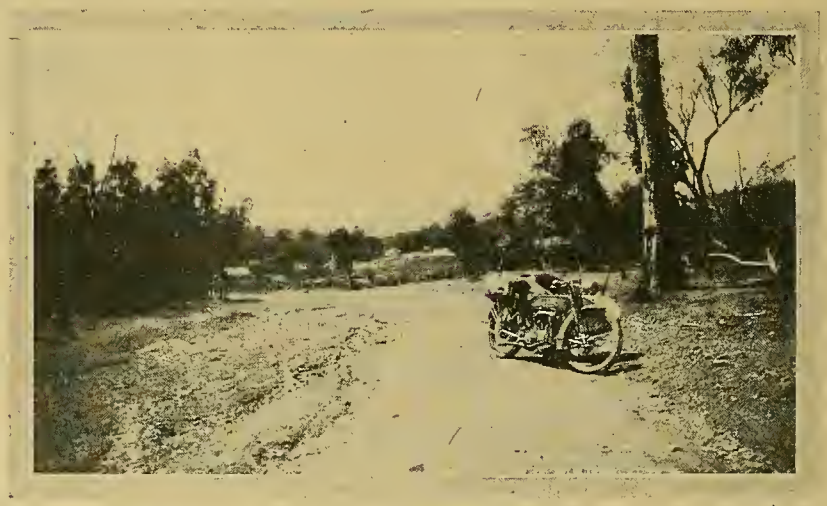
Mountain Climbing in New South Wales.

A Fairly Favourable Impression of Australian Roads.

AMONG the Australians one meets in England to-day one finds many keen motor cyclists, and the fact that the Australian is very often a speed man would seem to indicate that the roads of the Commonwealth are not all so bad as many Britishers imagine. There are, indeed, many excellent roads in Australia, while the main road across Tasmania is one of the most brilliant speed stretches one could wish for. In the bush regions the roads are, of course, abominable beyond words, yet there are few settled portions of Australia where the conditions are so uniformly bad as entirely to prohibit the pleasure of motor cycling.

There is a distinctly Colonial atmosphere about the photographs reproduced on this page. So far as the road surfaces go, the views savour little of the common state of things in pioneer lands, where man makes the forest trails into roads and Nature converts the roads into river beds, yet if the top photograph be closely examined it will be seen that the hand of Nature has been at work. The portion of the road occupied by the Harley-Davidson outfit appears good and sound, but Nature has evidently realised the convenience of the other half as a watercourse, and has proceeded to use it as such, much to the detriment of the surface.

This photograph was taken near Parkes, about the centre of New South Wales, and during a "big trip" by a young Australian just before he joined the Colours.



A Harley-Davidson sidecar on a road possessing a variety of surfaces near Parkes, N.S.W.

Of the three bottom views, the one on the left was taken at the interception of four roads on the top of Cambewarra Mountain, the road on the left leading to Nowra. No doubt this point will be recognised by many khaki-clad Australians now in England. The pull up from Nowra is three miles in extent, the climb being very tiring even for a powerful solo mount, the sandy nature of the road deadening one's engine like a head wind.

The machine figuring in the foreground is a 6 h.p. M.A.G.-engined Rover. As yet very few of this model have been produced by the Rover Co., but one or two have evidently found their way Overseas. The machine in the background may be recognised as a Bradbury of not particularly recent date. This machine was sold for £45 shortly after the photograph was taken, second-hand prices being good in Australia.

The other two views were also taken on Cambewarra Mountain, and the photographer describes the road as "a king to some of the roads here on the coast." On the extreme right a young Australian named Lawrie, who has now been in France some months, is shown taking a steep corner during this mountain ascent on the 6 h.p. Rover. This is the point at which most cars drop into their bottom gears, for, though the surface is like a billiard table, the gradient is severe, while the bend is one of the "never ending" variety. The background of open country and undulating forest land looks very inviting.

MOUNTAIN CLIMBING IN NEW SOUTH WALES.

Typical views of landscapes in New South Wales. The motor cycle is of particular interest, being a 5-6 h.p. M.A.G. twin engined Rover, with three-speed countershaft gear and chain-cum-belt transmission. A number of this type of mount is in use Overseas.

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle, 20, Tudor Street, London, E.C.4, and whether intended for publication or not must be accompanied by a stamped addressed envelope for reply. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Inland Revenue Tax.

I have not taken out an Inland Revenue licence this year. Should I be able to obtain one for the half-year for 10s. next month?—T.J.

An Inland Revenue licence can be obtained at half-price after October 1st for the remaining three months of the year, but not in July.

Clutch Slip.

I have a 3½ h.p. single, fitted with a three-speed Sturmey-Archer hub. This machine until recently took all hills without difficulty. Finding, a week or two ago, that gas was getting past the rings, I fitted a new top ring. For a few days after fitting this I was troubled with overheating, but that phase has now gone, and I have trouble in tackling a steep incline, especially in low gear. In top and middle the machine runs well, but immediately I change into low it seems to slow down to a crawl, though the engine seems to maintain its revolutions. Can you suggest the cause? Do you think the clutch is slipping? I have washed it out, but with no improvement. All adjustments seem correct.—W.E.D.

This looks extraordinarily like clutch slip. Perhaps the clutch springs require renewing. You can easily tell if the clutch is slipping by engaging the low gear and attempting to push the machine without raising the exhaust lifter and with the throttle open.

Descending a Hill.

I have a 2½ h.p., two-speed, two-stroke motor cycle, and would like to know if I am correct in running it in neutral gear and with exhaust valve held up when descending hills. Also, I should like to know if the correct way of changing gear from neutral after the descent of a steep hill to high or low gear is by moving gear lever when the machine is running slowly and then releasing the exhaust.—B.R.P.

If you descend the hill in neutral there is no object in raising the compression release lever after you have stopped the engine by its use. The only objection to descending hills with the gear in neutral is that you have to rely absolutely upon your brakes, and the engine cannot check your speed and so save your brakes. There is also a difficulty in re-engaging the gear at the bottom of a hill. It is better, therefore, to leave the engine in gear and raise the compression release lever, checking with the brakes when necessary. If coasting down in neutral the best method is to stop before reaching the bottom of the hill, then engage your gear and restart. If you attempt to engage with the machine running you are sure to make a noise and may damage the teeth or dogs of the gear.

Running on Paraffin.

I am running my machine on equal parts of paraffin and petrol and was told recently that it would soon score the cylinder and burn the rings and valves. Would you kindly let me know if this is correct? I must say the mixture is a perfect success otherwise.—J.H.

Half paraffin and half petrol should not damage the engine. It might cause an extra amount of carbon deposit and extra knocking. If you use rather more lubricating oil and of a heavier quality the engine should not suffer any harm, so long as you have fitted an efficient hot air intake.

Pre-ignition.

I have a 1912 3½ h.p. single, from which I am experiencing the following trouble: (1.) It runs well on the level and on slight inclines, but will not mount hills of 400 or 500 yards, and gradually stops when near the top of the hill, but starts again immediately. It appears to overheat. I have cleaned the exhaust and fitted new valve springs obtained from the makers. (2.) I am using a B. and B. carburetter (32 jet), a good plug, and No. 2 Shell petrol. I find that the points of the plug extend slightly below the valve cap in the cylinder. (3.) Oil is working out from between the cylinder and crank case. Does this cause loss of compression? The cylinder has been taken off and cleaned, and the machine has not run forty miles since.—J.C.

(1.) The trouble may be due to the plug, which is causing pre-ignition. (2.) Try a shorter reach plug, which might help matters. If the point projects too far into the cylinder, pre-ignition is likely to ensue. (3.) The fact that the oil is leaking between the cylinder and the crank case (if not to any great extent) need not worry you. This does not cause loss of compression, but it may indicate that the crank case release is not functioning properly.

Scott Lubrication.

I have noticed that several correspondents asking advice about the Scott oiling system have been advised to "close" up the brass nipple in one of the tubes leading into the crank case, while "H.M.B." advises it in his article on "Tuning a Scott." I should be interested to know if this closing up has been actually done. I tried it, and found that the nipple would not "bed down" in the crank case afterwards.—LIMIT GAUGE.

We have many times equalised the oiling of the Scott cylinders by the method suggested of tapping up the nipple contained in the oil pipe which is admitting an excess flow. Evidently you tapped the nipple round the edges instead of in the centre, thereby burring over the edge. Another way of doing it is to drop a spot of solder over the hole, then drill out to a smaller size. It is very important that the nipples should bed down properly, otherwise oil will escape round the sides of them.

Loss of Compression.

I have just bought a single-cylinder, 3½ h.p., air-cooled a.o.i.v. motor cycle engine. On taking it down for cleaning I found no carbon deposit, piston rings free, and all clean inside. On reassembling it I found the compression had entirely gone, but on taking off the detachable cylinder head and stretching a piece of rubber over the top of the cylinder and drawing the piston down, I found that a very powerful vacuum had formed; yet with head on it will not open the inlet valve. Both valves are seating properly and have been ground in. (2.) There seems a good deal of pressure blowing out through the oil hole in the crank case. Does this mean that the compression is leaking past the rings?—H.G.S.

(1.) The compression is probably lost either through the external seating of the inlet valve or through the detachable head, and if you have not a good copper and asbestos washer, and the joints of the union itself are not clean and true, you will find it difficult to keep the compression. Replace the cylinder head and smear the joint with oil. Rotate the engine, and you will then be able to see if there is a leakage. (2.) This is the relief valve hole, which merely releases the compression in the crank case, as it is intended to do.

Changing Gear.

I have a 2½ h.p. two-speed four-stroke, and I have found great difficulty in changing the gear from low to high, as there is no clutch. I have tried lifting the exhaust valve, but as soon as the gear engages, the engine stops.—P.N.L.

Your difficulty in changing gear is probably want of practice. You have to accelerate on low gear, and then, when changing up, raise your exhaust valve, wait a moment while in neutral, and then engage the top. If you change gear according to these instructions we think you will get over your trouble. Get a practised rider to show you what to do.

A Temporary Tank Repair.

(1.) My petrol tank leaks in two places. Is it possible to repair these without soldering? Would seccotine or any cement do? (2.) Will my machine give good results if half petrol and half paraffin be used as fuel. Is it necessary to fit a vaporiser when using this mixture? (3.) Should the engine be given more oil when a petrol-paraffin mixture is used? (4.) What are the chief points to look for in the way of wear when purchasing a second-hand motor cycle?—G.R.

(1.) You can repair a petrol leak temporarily by the application of an enamel called "Coverole," obtainable from the Service Co. Another very temporary measure is to make an angle-piece of tin, smear soap over the joint, and strap the angle-piece up against the leak, when it might hold. Solder is the only means of making a permanent repair, but it is a dangerous job, and should be undertaken only by a competent tank maker. (2.) Your machine should give good results with half petrol and half paraffin. You should, however, fit a warming pipe to the carburetter air intake. (3.) Yes, a little more oil should be given. (4.) Vertical play in the bearings and wear in the tappets and valve guides. Grip the driving-shaft firmly in both hands and move vertically and in a horizontal direction.

Difficult Starting.

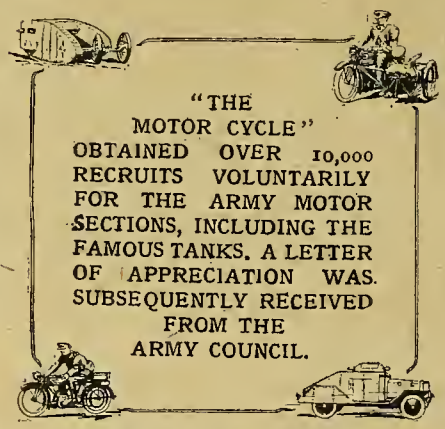
(1.) I have a 1915 h.p. twin, and find that, when cold, it will start on the first kick, but when the engine is warm it takes quite a long time to start it up again. (2.) Also, the engine runs badly, the pilot jet requiring more throttle than I think is necessary, and it will take very little extra air, and, consequently, soon overheats. (3.) Also, the clutch does not work as it ought to, as it sticks badly when changing gear. I find that, in order to get the clutch to engage I have to push the pedal up, thereby causing it to engage too suddenly. (4.) Am I liable to be pulled up by the police for driving without a permit, as I have no permit, having purchased petrol with the machine? I have heard that it is illegal to drive without a permit.—A.H.

(1 and 2.) A smaller pilot jet would probably cure your starting difficulty. When the engine is warm, before attempting to start cause the engine to rotate by means of the kick-starter with the exhaust valve lifted. This will have the effect of pumping out an over-rich mixture, whereupon the engine should start straight away on the pilot. (3.) Possibly the clutch requires to be taken down and cleaned; it should be examined to see if it is sticking anywhere. Look out, also, for excessive wear in the control. Stronger springs may be necessary. (4.) The only permit you require is the ordinary driving licence. There is nothing to prevent your riding a motor bicycle at the present time for any purpose you may think fit, provided you have the fuel on which to run it.

Making a Cone for a Sidecar Wheel.

Please tell me what is the best steel to use for making cones for a sidecar wheel, and is there any special mixture I can buy to make it very hard?—J.H.

The cone should be made of ordinary carbon tool steel. It should be hardened by heating to a dull red, then plunging in oil. After the first process the ball races should be brightened by putting it in a lathe and polishing with emery paper, after which it should be heated to a dark straw colour in a Bunsen burner and then cooled in oil again.


"THE MOTOR CYCLE" OBTAINED OVER 10,000 RECRUITS VOLUNTARILY FOR THE ARMY MOTOR SECTIONS, INCLUDING THE FAMOUS TANKS. A LETTER OF APPRECIATION WAS SUBSEQUENTLY RECEIVED FROM THE ARMY COUNCIL.

Timing the Valves and Ignition.

My machine is a 1912 Zenith-Jap, 90 mm. × 77.5 mm. single, with overhead valves. (1.) Please give me the correct valve timing for this machine. (2.) The best method of timing the magneto. The spark is controlled from the handle-bars by a Bowden lever. (3.) I have a well-known make of speedometer—the trip and total mileage are apparently correct—but I am very doubtful about the speed hand. A friend, who is an authority on these matters, says if the former is correct the latter must be so. Is this right?—J.M.

(1.) Time the valve as follows: Set the exhaust valve to close just after the completion of the exhaust stroke. It will then commence to open when the piston is about one-seventh of the length of the stroke from the bottom of the firing stroke. The inlet should commence to open as the exhaust closes, and remain open for one complete stroke of the piston, or while the flywheels turn through 180°. (2.) Place the piston exactly on top of the compression stroke, and connect up the magneto with the points just about to break, and the ignition lever two-thirds retarded. This will mean that the explosion, when the ignition is fully retarded, will take place when the piston has travelled about 1.5 mm. down the firing stroke. (3.) If the trip and total mileage are correct, this signifies that your gearing of the speedometer is correct, but it does not follow in the least that the speed reading is correct.

Permits to Drive.

(1.) Must I have a petrol licence before I may ride (in addition to the usual licences)? (2.) What is a petrol substitute? If I choose to install suction gas, and run on coal gas or naphthaline (solids), am I liable to be summoned? (3.) Since motor cycles seem to run on anything between acetylene and paraffin, can the circumlocution office, or any other, determine which internal combustion engines are petrol engines? —J.A.R.

(1.) It is not essential to have a petrol licence, but it you have to buy petrol from a dealer then a petrol licence is indispensable. (2.) Petrol substitute has practically the same definition as petrol, under which is included any inflammable hydro-carbon (including any mixture of hydro-carbon, and any liquid containing hydro-carbon) which is capable of being used for providing reasonably efficient motive power for a motor car. (Finance Act, 1909-10-16-17.) We take it that you may, if you like, run on suction gas, on coal gas, or naphthaline without taking the risk of offence. (3.) No, such authority cannot determine what is a petrol engine, which is simply an internal combustion engine capable of running not only on petrol gas, but on any other explosive gas.

RECOMMENDED ROUTES.

BRISTOL TO CHELMSFORD.—W.P.R.

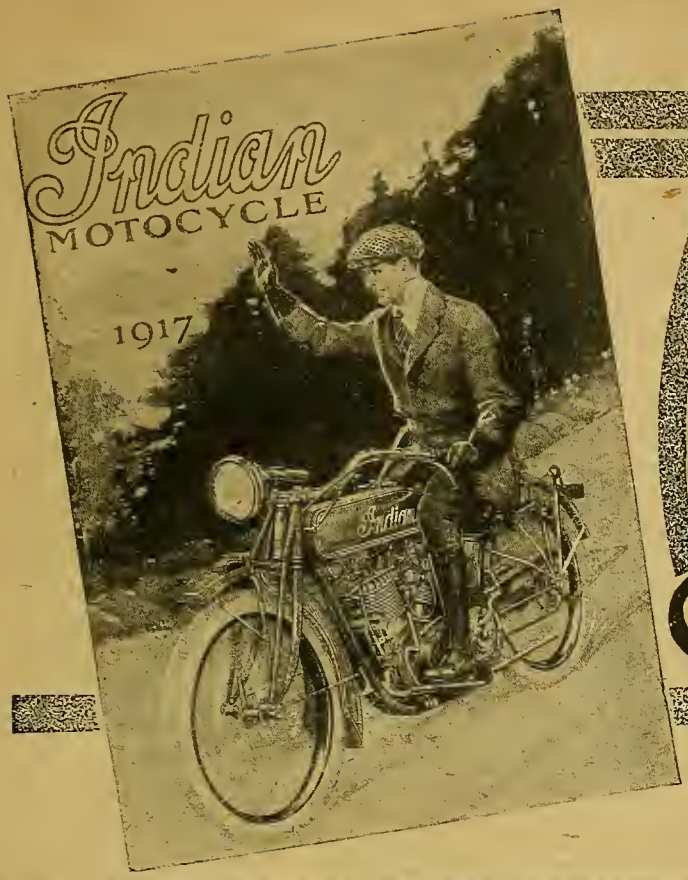
Bristol, Acton Turville, Malmesbury, Cricklade, Highworth, Faringdon, Kingston Bagpuze, Oxford, Thame, Aylesbury, Tring, Berkhamsted, Boxmoor, St. Albans, Hatfield, Hertford, Stanstead Abbots, Eastwick, Pye Corner, Harlow, Morton, Chipping Ongar, Chelmsford. Approximately 150 miles.

LONDON TO LUDLOW.—J.W.W.

Leave by the Bath Road, which is in better condition than the Oxford Road at the present time, and go through Brentford, Hounslow, Slough, Maidenhead, Henley, Nettlebed, Benson, Dorchester, Oxford, Woodstock, Enstone, Chipping Norton, Moreton-in-the-Marsh, Broadway, Evesham, Wyre Piddle, Spetchley, Worcester, Great Witley, Tenbury, Brimfield, Ludlow.

BIRMINGHAM TO EDINBURGH.—W.Y.

Birmingham, Sutton Coldfield, Lichfield, Armitage, Rugeley, Weston, Stone, Newcastle-under-Lyme, Holmes Chapel, Knutsford, Warrington, Hulme, Newton, Wigan, Standish, Preston, Garstang, Lancaster, Carnforth, Milnthorpe, Kendal, Shap, Penrith, Carlisle, Longtown, Langholm, Teviothead, Hawick, Selkirk, Galashiels, Stow, Heriot, Fushiebridge, Edinburgh. Approximately 195 miles.



"Count the Indians on the road."

HENDEE MFG. CO.,
"INDIAN HOUSE,"
366-368, EUSTON ROAD, LONDON, N.W.
Telephone—Museum 1643.
Telegrams—"Hendian, Eusroad, London."
AUSTRALIA—
109-113, Russell Street, Melbourne.
CANADIAN WORKS—
12-14, Mercer Street, Toronto.

Indian

AFRICA—
Indian House 127-9, Commissioner Street Johannesb rg.
Indian House, 579, West Street, Durban
Indian House, Strand Street, Port Elizabeth

The Economical Tyre

ASK any user of Beldam Tyres why they appeal to him and he will tell you "They wear so long." The next reason he will give you is because it is so hard to puncture or cut them. The why of the long wear is high quality—quality always counts. The why of the seldomness of cuts and punctures is the unique tread—thick where most rubber is needed, and so moulded that displacement is lateral.

Test a Beldam and you will become a Beldam Enthusiast.

Write for prices—also for cost of Beldam Retreads

The Beldam Tyre Co., Ltd.,
Brentford, - - Middlesex.
New Zealand: J. E. Fitzgerald, 189, Lambton Quay, Wellington. Cape Colony: The Tyre and Motor Co., Rodney St., Port Elizabeth. India: Wilkinson & Co., 7, Old Court House St., Calcutta. Ireland: P. Drohan & Sons, Carrick-on-Suir.

BELDAM
ALL BRITISH TYRES

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed ——— & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

☞ DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [2305

1915 A.J.S., 6h.p., Gloria sidecar, lamps, etc., mechanically perfect, mileage 4,000; £82/10, no offers.—20, Redlam, Blackburn. [X1718

A.J.S., 1915, 2¾h.p., 3-speed, clutch, T.T. bars, P. and H. head lamp, generator, rear lamp, tools, sound tyres, machine perfect throughout; £43/10.—Advertiser, 156, Gt. Portland St., W.1. [4203

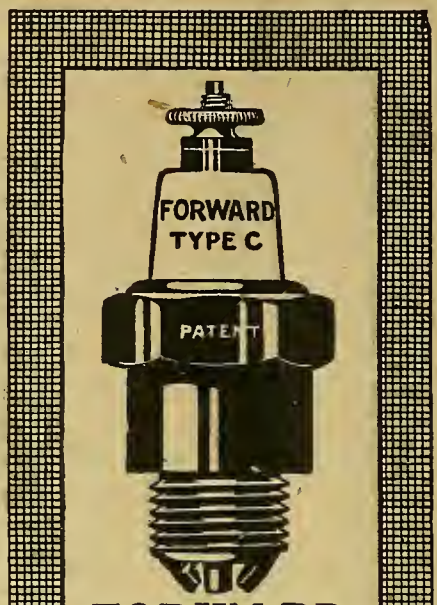
A.J.S., 1914, 6h.p., powerful, Mills-Fulford sidecar, 3 speeds, kick starter, hood and wind screen, carrier, lamps, accessories, good condition, sound and perfect, a good turnout; £80.—Geldard, 83, Church St., Birkenhead. [4400

LATE 1916 6h.p. A.J.S. Combination, as new and perfect, been about 1,500 miles, complete with spare wheel, spring seat-pillar, wind screen, full set of spares, oil lamps and generators and horns, a splendid turnout.—Fancourt's Garage, Stamford. [4270

Alldays.

COLMORE Depots, Birmingham and Manchester, for immediate delivery of Allon 2-strokes. [X0796

1917 2½h.p. 2-stroke 2-speed Allons, £42; gradual payments, or exchange.—Wauchope's, 9, Shoe Lane, London. [4471



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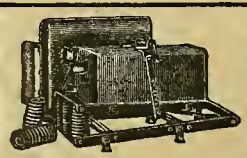
Plugs mean perfect ignition — always — and there is the basis of their great reputation — *the result of merit purely.*

Ask for our new Catalogue.

FORWARD MOTOR Co.,
35, Forward Works,
Summer Row, Birmingham.

"The Fasteners that never fail." The Forward will interest you also — they'll satisfy you, too, just as they do H.M. War Office and the Admiralty.

There are several patterns.



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ADJUSTABLE SEAT & PETROL CARRIER
13 Models to suit all requirements.
Send for list & particulars.
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Photography and FOCUS
Every Wednesday. Twopence.

MOTOR CYCLES FOR SALE.

Alldays.

ALLDAYS Matchless, 3½h.p., 3-speed, £25; coach-built sidecar, £6; exchange twin.—Johnson, 61, Osborne Rd., Acton. [4433

ALLDAYS Allon, 2-speed, 1915, E.I.C. mag., Dunlop tyres, electric horn; £31; extended payments arranged.—Service Co., 292, High Holborn, London. [X1816

ALLON, 2-speed, drip feed lubrication, E.I.C. mag., Amac carburetter, long exhaust pipe, pan saddle; £40; extended payments arranged.—Service Co., 292, High Holborn, London. [X1817

ALLON 2¾h.p. 2-stroke Motor Cycle, £38/14, or on extended payments terms, deposit £7/14, and 12 monthly payments of £2/13; 2-speed and other models also supplied.—Harrods Stores, Ltd., Motor Cycle Dept., Brompton Rd., S.W. [4455

WAR Bargain.—Guaranteed late 1914 2¾h.p. Alldays, 2-stroke Villiers engine, used 6 months only, take 2 easily, heavy 26×2¼ tyres, lamp, horn, tools, etc., splendid order; accept £15 quick sale.—Letters only, Millard, 3, Grantley Terrace, Sydenham Rd., Guildford. [X1737

Antoine.

ANTOINE, 3½h.p., Bosch mag., B. and B., good condition and running order; £10.—Write for appointment, 26, Powell Rd., Clapton. [4239

Ariel.

ARIEL, 3½h.p., 1917, 3-speed countershaft models in stock.—Crow Bros., Guildford. [2562

COLMORE Depots, Birmingham, Manchester, Liverpool, and Leicester, for all models of Ariels. [0797

ARIEL, 1915, 3½h.p., 3-speed countershaft gear, kick start; £37/10.—G., 48, Dalberg Rd., Brixton, S.W. [4473

ARIEL, 3½h.p., 1917, actually in stock; £72/10; easy payments and exchanges.—Lamb's, 151, High St., Walthamstow, E.17, and 50, High Rd., Wood Green, N. [4342

Auto-Wheels.

GENUINE Wall Auto-Wheel, little used, splendid condition and running order; £8/10.—Murray, 37a, Charles St., Hatton Garden, Holborn. [X1762

AUTO-WHEEL (Wall), in splendid order, reliable, economical; £9/5, no offers.—Vickers, 57, Oakington Manor Drive, Wembley Hill, Middlesex. [X1779

Bat.

BAT, late 1912, 5-6h.p., speed gear, P.M. Melford sidecar.—Box L3,901, c/o *The Motor Cycle.* [4218

BAT, 8h.p., 2-speed, chain and belt drive, Bramble coach sidecar; £39/10.—Motor Exchange, 68, Horton St., Halifax. [4277

Bradbury.

1915 Bradbury, 4h.p., C.B. sidecar, 3-speed countershaft, chain driven, kick starter; £48.—271, Manchester St., Oldham. [X1802

B.S.A.

COLMORE Depots, 261, Deansgate, Manchester, for immediate delivery of B.S.A. [0798

B.S.A. New 1917 Model K's in stock; £64.—Colmore Depot, B.S.A. Agents, 211, Deansgate, Manchester. [0888

B.S.A., new 1917, 4½h.p., 3-speed Model K, in stock; £64.—Eagles and Co., High St., Acton, W.3. [X1783

B.S.A., 3½h.p., 2-speed, and new coach sidecar; £50, bargain.—W. and H. Motor Co., Ltd., 287, Deansgate, Manchester. [4107

1917 B.S.A. in stock. Catalogues free. Spare parts per return. 1in. belts, as fitted by makers, 8/6, post paid.—Albert L. Pitts, Redditch. Tel.: 91. [X0529

B.S.A., 1916½, 4½h.p., chain-cum-belt, 3-speed countershaft gear, Lucas lamps, mechanical horn; cost £68, bargain, £53.—Crabb, 61, Streatham Hill, S.W. [4303

B.S.A., 3½h.p., lamp, horn, tools, spares, and waterproof overalls suit, overhauled and renovated Feb., 1917; sell £25, or nearest offer.—Box 1,008, c/o *The Motor Cycle.* (D) [X1842

B.S.A., 1916 Model H and Canoelet No. 1 sidecar, lamps, and horn, ridden 700 miles, £73/10; also 1912 2-speed model; also 1915 kick-starter and sidecar, £58/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [4338

B.S.A., 4½h.p., chain drive, kick-starter, countershaft gears, excellent condition, late 1914, with light sidecar; immediate disposal, owner purchased car; inspection and trial any evening by appointment.—D.E.R., c/o Morley, 19, Sackville St., W. [4434

4½h.p. 1916 B.S.A., chain-cum-belt model, fitted with Watford speedometer, Lucas lamps, all tools, not ridden 2,000 miles, 3 speeds, free engine, and kick starter, in every respect as new, with all accessories, complete, and ready for the road; £55; would make handsome sidecar machine, guaranteed.—Wauchope's, 9, Shoe Lane, London. [4466

Calthorpe.

COLMORE Depots, Birmingham, Manchester and Liverpool, for Calthorpe motor cycles. [0799

MOTOR CYCLES FOR SALE.

Calthorpe.

1915 Calthorpe, 2-stroke, 2 speeds, countershaft; £18, or near offer.—7, Havelock Rd., Belvedere, Kent. [4444

1915 Calthorpe-Jap, 2¾h.p., Enfield 2 speeds, chain-belt drive; £26/10.—Motor Exchange, 68, Horton St., Halifax. [4278

1917 2¾h.p. New Calthorpe-Jap's, £39/18; extended payments or exchange arranged.—Wauchope's, 9, Shoe Lane, London. [4469

CALTHORPE Motor Cycles.—All models in stock for immediate delivery.—P. J. Evans, 87-91, John Bright St., Birmingham. [X1804

CALTHORPE, 1916, 2-stroke, Enfield 2-speed gear, Lucas lamps and horn, with extra small tank to run on paraffin, excellent condition; £25, or near offer.—Cliff, Eltham. [4304

CALTHORPE-J.A.P., new September, 1915, not ridden 500 miles; ditto, with 2-speed gear; both owners on active service; what offers.—Box L3,915, c/o *The Motor Cycle*. [4478

OFFICER, proceeding Overseas.—1915 Calthorpe-Jap, 2¾h.p., Enfield 2 speeds, new 1917, Binks 3-jet, new Dunlops, semi-T.T., footboards, splendid condition; £31.—Box 1,010, c/o *The Motor Cycle*. [X1838

Campion.

1916 8h.p. Campion Combination, original tyres on; £70.—Missin, Cottingham, Hull. [X1794

Centaur.

16 Gns.—Centaur, guaranteed all sound, perfect riding condition, chain drive, 3½-4h.p., 120 to gallon, tools, etc.—Miller, 62, Hampstead Rd., N.W.1. [3992

Chater-Fafnir.

3½h.p. Chater-Fafnir, Bosch waterproof mag., B.B., Druid forks, good tyres, running order; £11.—Gale, New Rd., Ascot. [X1849

Chater-Jap.

1914 4h.p. Jap-Chater, N.S.U. gear; bargain. £23.—53, Brownhill Rd., Catford. [4440

1913 8h.p. Chater-Jap, Canoelet sidecar; £45, bargain.—B. Meredith, Brynawel, Highfield, Llanelly. [3959

Chater-Lea.

1915 8h.p. Chater-Lea and Chater sidecar, 3-speed countershaft, kick start, speedometer, hood, screen; £65.—29, St. Leonard's St., Bow. [4329

Chater-Peugeot.

7-9h.p. Chater-Peugeot Combination, 2-speed countershaft; £15.—53, Brownhill Rd., Catford. [4439

Chater-P.S.

CHATER-P.S., 1915, 2¾h.p., Chater 9a frame, Saxon forks, Chater wheels, Palmer cord 2½in. tyres, variable gear, free engine, 2 lamps, generator; £22/10; seen (appointment) any time.—Wentworth, 110, Cannon St., E.C.4. 'Phone: Central 5768. [4443

Chater-Zedel.

CHATER-ZEDEL, 2¾h.p., Ruthardt, B. and B., Druids, lamps, guaranteed perfect, and 5 gallons petrol; 12 gns.; call Sunday.—25, Cromwell Rd., Forest Gate. [4265

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CLYNO 6h.p. Combination, coachbuilt car, both perfect condition; £35, or near offer.—R., 5, Baldwyn Gardens, Acton, W. [4296

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DOUGLAS, 1913¾, T.T., 2-speed, all accessories, very fast, perfect; £26.—Godfrey, 32, Anerley Vale, Crystal Palace. [4391

DOUGLAS, late 1914, delivered March, 1915, 2¾h.p., 2-speed, clutch, kick start, as new; £35.—Olerenshaw, Broadwell, Rugby. [4227

DOUGLAS, 2-speed, F.E., engine just overhauled, new tyre, fast and reliable; owner at Front; £20.—58, Malvern Rd., Dalston, N.E. [X1760

DOUGLAS, 1916, 2¾h.p., War Office Black Model, 2 speeds, Stewart speedometer, lamps; £46.—31, Mount Pleasant, Redditch. [4314

1915 2¾h.p. Douglas, lamps, all accessories, as new, under 1,000 miles; £45.—Proudlock, East View, Chase Court Gardens, Enfield. [X1710

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DOUGLAS, 2¾h.p., 1916, W.D. Model, complete with electric lamps, speedometer, and horn; £43.—Moss, 11, Jackroyd, Newsome, Huddersfield. [X1716

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1915 2¾h.p. Douglas U Model, 3-speed, footboards, upturned or semi T.T. bars, Dunlops, good condition; £45.—Robinson's Garage, Green St., Cambridge. [4424

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1913 T.T. Douglas, 2-speed, 29 gns.; 1914 T.T., 2-speed, 32 gns.; 1915 T.T., 3-speed, 37 gns. [4367

DOUGLAS, late 1910, single speed, like new, thoroughly overhauled and new parts fitted; £18; owner joining.—Singleton, 15, Exmore Rd., S. Norwood, S.E.25. [4317

1914 2-speed T.T. Douglas, 1915 frame, all accessories, specially geared and tuned for speed, large copper exhaust, sporty bike; £32/10.—135, George Lane, Lewisham. [4264

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DOUGLAS, 2¾h.p., 1915, W.D., 2-speed, Lucas lamps, horn, speedometer, tools, mileage 3,000; owner in ship, so unable to ride; £42/10.—Box 999, c/o *The Motor Cycle*. (D) [X1672

DOUGLAS, Lady's 2¾h.p. 2-speed 1915 model, new condition; Douglas, gent's 2¾h.p. 1915 War Office Model. 2-speed.—Price and full particulars from Clark and Co., Motor Engineers, Doncaster. 'Phone: 176. [4261

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1916 Enfield, 3h.p. twin, lamps, horn, speedometer, T.T. bars; £38.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [0479

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ENFIELD and 2-seater Sidecar, 8h.p., 2-speed, Lucas dynamo lighting set; £95; extended payments arranged—Service Co, 292, High Holborn, London [X1813

ENFIELD 3h.p., not done 2,000, expensively equipped, original Palmer tyres unscratched; £45.—Bunting's Second-hand Showrooms, Masons Av., Harrow. [4460

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F.N., 1913, 2½h.p., 2-speed, shaft drive, Jones speedometer, free clutch; £15.—Thomas, Clevedon Rd., Midsomer Norton, near Bath. [X1704

1914 F.N., 4-cyl., 2-speed clutch model, Millford sidecar; £32, or exchange higher power.—Shutes, 524, Alexandra Park Rd., Wood Green, N.22. [4213

Grandex.

GRANDEX-PUP, 1917, 2h.p. Precision engine, 2-speed countershaft, foot controlled; £25; extended payments arranged.—Service Co., 292, High Holborn, London. [X1814

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HARLEY-DAVIDSON, 1916 electric dynamo model, all splendid order, new tyres; £85.—Batchelor, Clarence St., Kingston. [4413

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HARLEY, 1916 racing model, 7-9h.p., single speed, clutch, had very little use; £70; extended payments arranged.—Service Co., 292, High Holborn, London. [X1818

LATE 1916 7-9h.p. Harley-Davidson Combination, electric lighting, had very little use, like new throughout; £78, or nearest.—C. Nicholls, Penwithick, St. Austell. [X1845

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HUMBER, 3½h.p., free engine, 2-speed, handle starting, with sidecar, splendid condition; £23.—Ragher, 73, Tree Colt St., Limehouse, E. [4299

1911 Tourist Humber, £15/10; 3½h.p. 1910 Humber, £15/10; 1912, 2-speed, 3½h.p., £22/10.—Motor Exchange, Horton St., Halifax. [4286

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INDIAN, 1916, 5h.p., 3-speed, kick start, sporting coach sidecar, splendid condition; £54.—235, Floyer Rd., Small Heath, Birmingham. [X1771

1915 5h.p. Indian, Phœnix sidecar, 2,500; £50; trial, appointment; unridden since November.—Wilson, Boughton, Monchelsea, Kent. [4485

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INDIAN, 1914, 7-9h.p., 3-speed, clutch, with sidecar, in perfect mechanical condition; £32.—Apply, or write, Pacy, 143, Larkhall Lane, Clapham. [4407

INDIAN 1915 Combination, electric fittings, spring frame, beautiful turnout, little used; £62/10.—51, Maplethorpe Rd., Thornton Heath, S.E. [4393

INDIAN, 1915, 5h.p., T.T., 3-speed, latest improvements, splendid condition; £45, or exchange lightweight and cash adjustment.—20, Ivydale Rd., Liverpool. [X1803

5-6h.p. Indian, unused since 1914, new Lucas lamp set, and spare new tyre, cost £5; just overhauled, cost £7; little used, dropped frame; £25.—80, Bispham Rd., Southport. [X1671

1916 Indian, 5h.p., T.T., 3-speed, kick start, Canoeler coach racing sidecar, tools, Lucas lamps and mechanical horn; £60, bargain.—Jones, Motor Engineer, Shrewsbury. [X1723

7-9h.p. Indian, clutch model, 1915, as new, mileage 50, lamps, horn, semi T.T. bars; £48, or exchange lightweight.—86, Laurie Park Rd., Sydenham, S.E. 'Phone: 1853 Sydenham. [4325

7-9h.p. Indian and Phœnix Sidecar, new last November, mileage 2,500, spring frame, electric head and tail lamp, electric horn, speedometer; cost £120, price £70.—Ormerod, Wroxham, Norfolk. [X1719

INDIAN Combination, new in March, mileage 2,000, electrical equipment, speedometer, extra horn (mechanical), £7 worth spares; cost £110, £70 quick sale.—Colin Park, The Hyde, Hendon. [4133

RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—1914 Indian, 7-9h.p., 2-speed, hand and foot clutch, new tyres, re-enamelled, as new, 35 gns.; Indian, 1913, 7-9h.p., 2-speed, clutch, 29 gns.; Indian, 1911, 5h.p. twin, 17 gns. [4363

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NEARLY New Ivy 2-stroke, lamps and spares; £20; topping machine.—A. J. Young, High St., Newmarket. [3953

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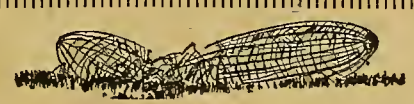

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RIDER TROWARD and Co., 31 and 78, High St., Hampstead.—New Imperial, 1916, 2-speed; 25 gns. [4364

NEW Imperial, 2¾h.p., 2-speed, clutch, kick starter, lamp, horn, 1915 model; £30.—Batchelor, Clarence St., Kingston. [4412

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BROOKLANDS Norton, 1916½, run 400, as new; £42.—278, Bolton Rd., Ashton-in-Makerfield. [X1778

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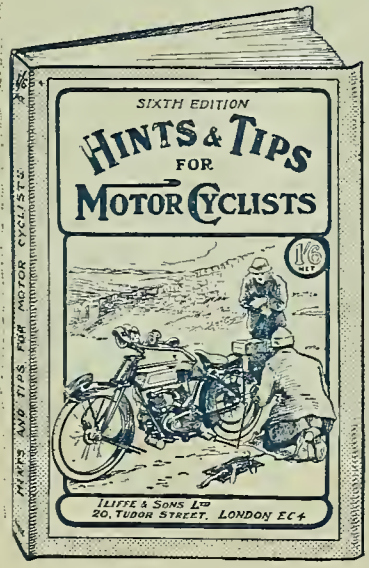
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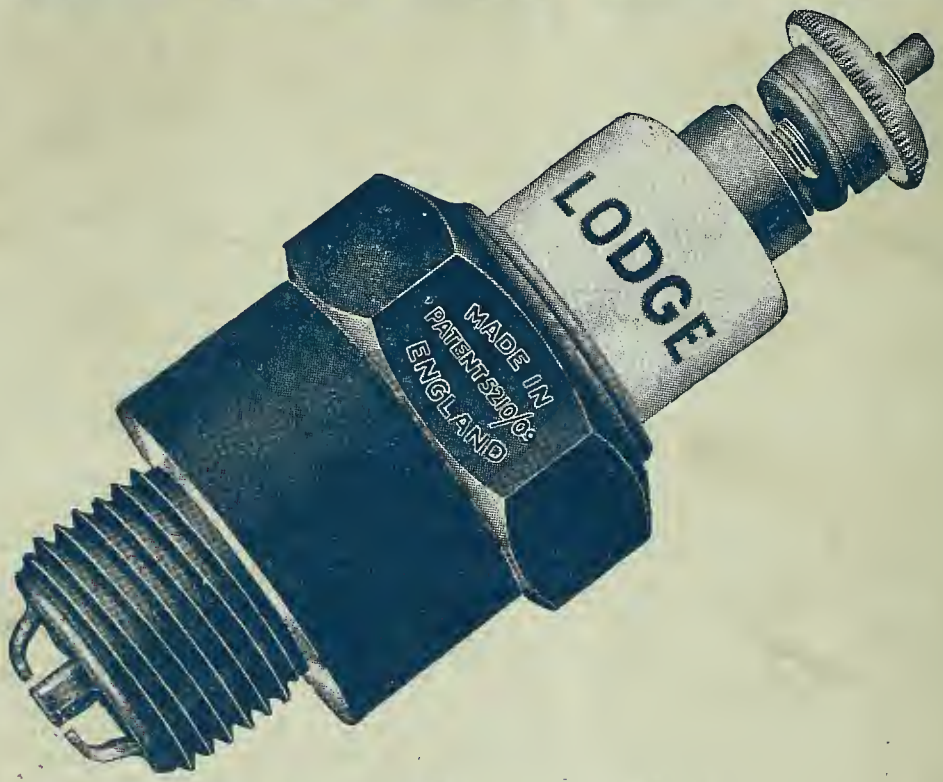

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